Ludington Area School District

SECTION 00 01 10
TABLE OF CONTENTS

DIVISION 00 – BIDDING & CONTRACT REQUIREMENTS

DIVISION 11 – STAGE EQUIPMENT

APPENDICES

END OF SECTION

SECTION 00 01 15
LIST OF DRAWINGS

File/Name	*Description*
TL-1	Symbols, Notes & Work Scopes
TL-2	Box & Fixture Schedule
TL-3	Existing Lighting System
TL-4	Lighting System Plan
TL-5	Lighting System Riser

END OF SECTION

SECTION 00 11 16
INVITATION TO BID

PART 1 - GENERAL

1.01 WORK INCLUDED: DISTRICT AUDITORIUM RENOVATIONS

A. Ludington Area Schools (Owner) is seeking bids for purchase and installation of new Auditorium Lighting, Rigging & Draperies equipment and installation. Proposed systems shall be configured and installed to service Owner's classrooms across multiple instructional facilities, and as described herein.

B. Project: DISTRICT AUDITORIUM RENOVATIONS

C. Owner: Ludington Area School District
809 E. Tinkham Ave.
Ludington, Michigan 49431

D. Designer: Communications by Design, Inc.

E. Sites of Work:

1. Ludington High School
508 N. Washington Ave.
Ludington, Michigan 49431

1.02 GENERAL DESCRIPTION OF PROJECT SEQUENCE

A. Sequences and dates specified herein are for information only and indicate the plan and intent of the Owner. Actual dates shall be established based on final award of project.

B. Sequence of operations shall be established by the Contractor within the guidelines established by the Owner as required to meet schedules.

C. Schedule:

1. Request for Bid Distributed: January 12, 2024

2. Question and Clarification Deadline: January 17, 2024

3. Public Bids Due: January 25, 2024 at 12:00pm

1.03 TYPES OF BIDS

A. Bids shall be submitted in total and with required detail for each item bid and as is required herein and include all portions of the work identified for the individual bid package as specified herein. Bids shall be made on unaltered

bid forms as included herein. Bidder shall fill in all blank spaces and the bid shall be signed by a legal officer or agent authorized to bind the bidder to a contract.

1.04 TIME AND PLACE OF BID RECEPTION

A. Physically sealed bids for the base bid work will be received at the district office and read aloud at a public opening. Bids arriving after the appointed time as determined by the Owner's representative conducting the public opening, shall be returned unopened. Bids will be accepted beginning forty-eight (48) hours prior to the appointed opening time provided they are in sealed packages and addressed as specified herein.

B. Bid Receipt Deadline: 12:00pm on January 25, 2024

C. Bid Opening Location: Ludington Area School District
809 E. Tinkham Ave
Ludington, Michigan 49431

D. Faxed or electronically delivered bids will not be accepted.

1.05 EXAMINATION AND PROCUREMENT OF DOCUMENTS

A. Specifications and any relevant Drawings may be obtained from the Technology Designer. Contractors may obtain copies by documented request to Communications by Design, Attn: Rebecca Szilagy. Requests may be made by:

1. Writing – 4101 Sparks Drive SE Grand Rapids, MI 49546

2. Email – rszilagy@cbdconsulting.com

1.06 BID SECURITY

A. Bid security equal to five percent (5%) of the total bid amount, must accompany each base bid in accordance with the Instruction to Bidders.

B. Bid security shall be either a Bid Bond issued by a company licensed in the State of Michigan to furnish bid security or Certified Check made payable to the Owner.

1.07 PERFORMANCE BOND COVERAGE

A. Selected Contractor(s) will be required to provide a performance bond and payment bond in an amount equal to one hundred percent (100%) of the bid amount including any accepted alternates at the Owner's discretion. Such bonds shall be issued by surety licensed by the State of Michigan and acceptable to the Owner.

1.08 OWNER'S RIGHT TO REJECT BIDS

A. The Owner reserves the right to reject any and/or all bids. The Owner reserves the right to accept a bid, or portion thereof by issuance of a valid purchase order within ninety (90) calendar days following the bid opening. No bids may be withdrawn during this time without the specific approval of the Owner.

B. Withdrawal of any Bids after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.

1.09 DEFINITIONS

A. "Owner" is intended to mean Ludington Area School District, a general powers school district.

B. For purposes of this project, the terms "Architect", "Engineer" and "Designer" are used synonymously to refer to Communications by Design, Inc., a Michigan Corporation.

C. The term "Bidder" refers to any organization properly and accurately submitting a complete "Intent to Bid Form" prior to the required time specified herein and subsequently properly submitting completed set of bid documents as specified herein.

D. The term "Contractor" herein is a reference to the firm(s) eventually selected by the Owner to provide the intended system(s), or any portion thereof, and fulfill the terms of the contract.

E. The term Contract is a reference to the collective set of documents, drawings, diagrams, Owner's Purchase Order, Addenda and all other materials as provided for herein defining arrangement between Owner and Contractor.

F. The term Addenda (or Addendum) are that portion of the Contract consisting of modifications, amendments, deletions or substitutions to the contract documents issued prior to the execution of the Contract.

END OF SECTION

SECTION 00 40 00
BID FORMS

SEALED BID LABEL

Separate, or fold over, the label on the line below, and affix to the exterior of sealed container so information is clearly visible for Bid Submission. Ensure label is attached in a manner to prevent accidental removal or defacement. Label shall serve as sole identification for sealed bid at submission.

BID TO: Ludington Area School District
809 E. Tinkham Ave.
Ludington, Michigan 49431

BID FROM: _____

_____

_____

PROJECT: DISTRICT AUDITORIUM RENOVATIONS
TECHNOLOGY BID #3031

INCLUDING ADDENDA: Addendum No._____Dated_____
Addendum No._____Dated_____

DUE: January 25, 2024 by 12:00pm

BID FORM

BID TO: Ludington Area School District
809 E. Tinkham Ave.
Ludington, Michigan 49431

BID FROM: _____

_____

_____

PROJECT: DISTRICT AUDITORIUM RENOVATIONS
TECHNOLOGY BID #3031

The undersigned, having familiarized themselves with all local conditions affecting the cost of work, and having examined the site and all applicable Bidding Documents herein, and herein referenced, including, but not limited to, all addenda issued thereto, hereby propose to furnish all labor, material, equipment, applicable taxes and services required for proper completion of each of the following categories of this project for the sum of:

Bid Category _____ Title_____

_____Dollars ($_____).
Said amount written above constituting the Base Bid

Bid Category _____ Title_____

_____Dollars ($_____).
Said amount written above constituting the Base Bid

Bid Category _____ Title_____

_____Dollars ($_____).
Said amount written above constituting the Base Bid

TAXES:
Bid sum includes all applicable taxes.

ALLOWANCES:
Base bid includes all applicable allowance cost(s) as set forth herein.

COST OF BONDS:
Bid sum includes cost of furnishing a Performance Bond and Labor and Material Payment Bond, each in the amount of one hundred percent (100%) of the bid.

ACKNOWLEDGEMENT OF ADDENDA:
The following addenda have been received, are hereby acknowledged, and their execution is included in both base bid and alternate bids herein.

Addendum No._____Dated_____ Addendum No._____Dated_____

ALTERNATES:
Based bid amount may be increased or decreased in accordance with each of the following alternate bids as may be selected, following procedures stated herein. Voluntary Alternates shown below are identified and described in detail on appropriate attachment(s) as referenced herein.

Voluntary Alternate A _____

Voluntary Alternate B _____

PRINCIPAL SUBCONTRACTORS
As required herein, the following Subcontractors are proposed to be used for this project:

Legal Name:_____Work Proposed_____

Legal Name:_____Work Proposed_____

Legal Name:_____Work Proposed_____

BID SECURITY:
Accompanying this Bid, as required herein, is a bid security in the form of Certified Check/Cashier's Check/Bidder's Bond in the amount of:

_____ Dollars ($_____),
payable to the Owner, which it is agreed, shall be retained as liquidated damages, not as a penalty, by the Owner, if the undersigned fails to execute the Contract in conformity with the form of Contract incorporated and referenced herein and fails to furnish specified bonds within ten (10) days after date of issuance of a Letter of Intent to the undersigned.

If awarded the Contract, the undersigned agrees to commence work within ten (10) calendar days after date of issuance of a Purchase Order, which shall be considered as the notice to proceed, and agrees to complete the work in accordance with the schedule herein.

FAMILIAL DISCLOSURE:
Accompanying this Bid, as required herein, is a legally executed and notarized Michigan Familial Disclosure Statement.

EXCEPTIONS:
Bidder takes no exception to terms, conditions, specifications and/or any other requirements herein unless expressly noted, and specifically identified as provided for herein on unaltered Contract Exception form accompanying this Bid.

SIGNATORY AUTHORITY:

The undersigned certifies they are an authorized agent of the bidding entity, and legally able to bind the bidding entity to the terms, conditions and responsibilities of this, and all referenced bid documents. Furthermore, the undersigned acknowledges an understanding that non-compliance of this authority or any other bidding requirements may result in forfeiture of bid security, dismissal of consideration of bid submitted, and/or personal liability against the signatory.

AGREEMENT:

The undersigned agree(s) to provide the post-bid information required within ten (10) days after notification of a Letter of Intent and to execute an agreement for work covered by this Bid on the Owner's standard Purchase Order for which terms and conditions are expanded to include all Bidding Documents and subsequent addenda issued thereto.

In submitting this bid, it is understood that the Owner reserves the right to reject any or all bids. It is further agreed that this bid is binding for a period of Ninety (90) days from the opening thereof.

Respectfully submitted,

Date: _____

Firm Name: _____

By: _____

Signed: _____

Title: _____

Official Address: _____

_____

Telephone Number: _____

Fax Number: _____

Primary Contact Email Address: _____

(If Corporation, affix Seal)

Michigan Familial Relationship Disclosure Statement

In accordance with Section 1267 of Michigan Revised School Code this sworn and notarized statement of an authorized representative, discloses any familial relationship between the owner and/or any employee of the Bidder, and any member of the project Owner's governing Board(s) or Superintendent(s).

If any conflict of interest is discovered subsequent to submission of bid, written disclosure shall be submitted to the project Owner within seven (7) days of discovery. The project Owner reserves the right to immediately terminate any contract with Bidder upon notification of a conflict of interest. Upon such termination, the project Owner shall compensate Bidder only for the value of any goods or services provided to the Owner prior to such termination as determined by Designer.

(Check only one Box Below)

☐ It is hereby acknowledged and certified by Bidder that no familial relationship exists between the owner or any employee of the Bidder and any member of the project Owner's governing Board(s) or Superintendent(s).

☐ A familial relationship exists between the owner or an employee of the Bidder and a member of the project Owner's governing Board(s) or Superintendent(s). The person(s) and the relationship(s) are as follows:

Bidder	***Board or Superintendent***
_____	_____
_____	_____
_____	_____
_____	_____

Bidder Authorized Representative:

Bidder: _____

Representative's Signature: _____

Print or Type Name: _____

Representative's Title: _____

Subscribed and sworn this _____ day of _____, 2024.

In the County of _____ State of _____

By _____ Seal or Stamp:
Notary Public Signature

My commission expires on: _____

IRAN LINKED BUSINESS AFFIDAVIT

All Bids shall be accompanied by a sworn statement disclosing any Iran Linked Business relationship that exists within the owners, including its officers, directors and employees.

The undersigned, owner or authorized officer of _____(the bidder), pursuant to Michigan Public Act No. 517 of 2012, the "Iran Linked Business" requirement provided in the Ludington Area Schools Proposals hereby represents and warrants that the bidder, including its officers, directors and employees, is not an "Iran Linked Business" within the meaning of the applicable Public Act, and that in the event bidder is awarded a contract as a result of this RFB, the bidder will not become an "Iran Linked Business" at any time during the course of performing under the contract. The bidder further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than $250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the District investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on future Requests for Bids for three (3) years from the date that it is determined that the person has submitted the false certification.

There is not an "Iran Linked Business" that exists within the bidder and/or owner, officers, directors and employees.

Bidder

_____

[Company Name]

_____

[Signature]

_____

[Title]

This instrument was acknowledged before me, a Notary Public,

in and for _____ County,

_____ on this _____day of _____, 20__,

_____

[Notary Public Signature]

My Commission expires: _____

Acting in the County of: _____

REFERENCES

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____
_____
_____
Date of completion: _____

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____
_____
_____
Date of completion: _____

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____
_____
_____
Date of completion: _____

CONTRACT EXCEPTIONS

Check one Box

☐ Bidder takes no exception to, and agrees to comply with all sections, terms, conditions and/or requirements of the Contract Documents.

☐ Bidder proposes the following exceptions to the Contract Documents:

Paragraph Number	***Explanation***
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

NOTE:
Exception(s) to any bid sections, terms, conditions and/or requirements deemed excessive for any reason by the Owner and/or Designer may result in disqualification of Bid.

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required for each division/category of work being bid. Submit a completed separate form for each division/category of work clearly delineating on the form the division/category of work for that form. Form submitted must materially match below both in content and format. Electronic version of this form for each project section/division/category being bid is required with bid package as Microsoft Excel compatible spreadsheet on a USB drive. Failure to provide appropriate and complete SCHEDULE OF VALUES for each division/category of work, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: ____Bid Division: 116133

ID	***Qty***	***Part Number***	***Mfg and Description***	***Unit Cost***	***Unit Labor Cost***	***Total Proposed Cost***
			FREIGHT			
			TRAINING			
			BONDS AND INSURANCE			
			GRAND TOTAL (Must match base bid)			

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required for each division/category of work being bid. Submit a completed separate form for each division/category of work clearly delineating on the form the division/category of work for that form. Form submitted must materially match below both in content and format. Electronic version of this form for each project section/division/category being bid is required with bid package as Microsoft Excel compatible spreadsheet on a USB drive. Failure to provide appropriate and complete SCHEDULE OF VALUES for each division/category of work, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: ____Bid Division: 116163

ID	***Qty***	***Part Number***	***Mfg and Description***	***Unit Cost***	***Unit Labor Cost***	***Total Proposed Cost***
			FREIGHT			
			TRAINING			
			BONDS AND INSURANCE			
			GRAND TOTAL (Must match base bid)			

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required for each division/category of work being bid. Submit a completed separate form for each division/category of work clearly delineating on the form the division/category of work for that form. Form submitted must materially match below both in content and format. Electronic version of this form for each project section/division/category being bid is required with bid package as Microsoft Excel compatible spreadsheet on a USB drive. Failure to provide appropriate and complete SCHEDULE OF VALUES for each division/category of work, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: ____ Bid Division: 116373

ID	***Qty***	***Part Number***	***Mfg and Description***	***Unit Cost***	***Unit Labor Cost***	***Total Proposed Cost***
			FREIGHT			
			TRAINING			
			BONDS AND INSURANCE			
			GRAND TOTAL (Must match base bid)			

END OF SECTION

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 OWNERSHIP

A. Bidders prepare and provide bids without any cost to the Owner and/or Designer. Once opened, bids become the sole property of the Owner. Bidders have no claim to, or ownership of bids opened. Bids become subject to all legal statutes including, if applicable, United States and Michigan Freedom of Information Acts and related laws.

1.02 COMPLIANCE

A. This document establishes the primary system(s) design configuration. The Bidder's bid response shall include all services, supplies, components and equipment required to provide a complete turnkey system(s) which meets or exceeds all specifications for each given bid item being proposed.

B. Owner prefers to enter into a contract with a single bidder for all materials for completion of this project, but shall consider combinations of portions of bids from various bidders. The Owner reserves the right to award portions of the project to multiple bidders who will be required to cooperate with one another in order to complete the work.

C. By their response, Bidders agree to comply with all sections, terms, conditions and/or requirements of the contract documents except as expressly noted, and specifically identified by paragraph number on the unaltered Contract Exceptions Bid Form. Exceptions to any bid sections, terms, conditions and/or requirements deemed excessive by the Owner and/or Bid Coordinator may disqualify Bid.

D. In compliance with the Freedom of Information Act (FOIA), the Owner shall make bid documents available for public review after issuance of purchase order to the successful bidder/s.

E. In connection with the execution of this Contract, Contractor and any Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin.

F. Negligence in preparation, improper preparation, errors in, or omissions from Bids shall not relieve Bidder from fulfillment of any and all obligations and requirements of the Contract Documents.

G. All Bid documents and worksheets must be completed in detail and submitted together on time.

H. All documents constituting the entire present agreement shall be construed in accordance with and governed by the laws of the State of Michigan.

I. Designer shall have authority for interpretation of Contract Documents. In the event terms, provisions or any other portion of the Contract Documents is/are in dispute, Designer shall have full and final authority to interpret the Contract Documents, and such interpretation shall be final and binding.

J. In the event of a conflict between any terms or conditions in any of the documents comprising the entire present Agreement, the terms and conditions set forth in this document shall take precedence.

1.03 NOTICE AND RESPONSE

A. Upon notification of Bidder being considered as a finalist, the Bidder shall provide to the Owner and Designer, within 48 hours, a current "Dunn and Bradstreet Supplier Evaluation Report" and other documentation as may be required of finalists herein and as requested by Owner and/or Bid Coordinator.

B. Bidder shall provide timely response to all requests from Designer and/or Owner regarding clarification and/or elaboration concerning, but not limited to its Bid as may be deemed relevant by the Owner and/or Designer.

1.04 PROTECTION AND SAFETY

A. Contractor shall continuously maintain adequate protection of all Work from damage and shall protect the Owner's property from injury or loss arising in connection with the execution of the Contract. Contractor shall make good any such damage, injury or loss, except such as may be directly caused by agents or employees of the Owner. The Contractor shall adequately protect adjacent property as required by law, by the Contract Documents, or as otherwise required, to cause no damage to them during the execution of the Contract. This requirement shall also apply to structures above and below ground as conditions of the site require.

B. Contractor shall be solely responsible for, and have control over means, methods, techniques, sequences and procedures for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the contract. Contractor shall take all necessary precautions for the safety of employees and visitors on the site of the Project and shall comply with applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and

progress of the Work, all necessary safeguards for the protection of workers and the community.

C. Contractor shall vigorously defend any and all suits that may be brought against the Owner by any person and/or entity, whether in the employ of the Contractor or not, for damage to property, and/or injury or death to persons alleged or claimed to have been caused by or through the performance of work.

1.05 DRAWINGS DIAGRAMS AND ILLUSTRATIONS

A. Drawings, Diagrams and Illustrations are diagrammatic in nature and indicate general arrangement and nature of systems and work included.

B. Floor plan drawings are provided to assist the contractor in preparing documentation and reports as required herein.

PART 2 - MATERIALS

2.01 VOLUNTARY ALTERNATES AND SUBSTITUTION OF SPECIFIED PRODUCTS

A. This Request for Bid describes a particular implementation. All Bids must provide pricing on the "base bid" as described herein. Voluntary alternatives providing comparable functionality with significant cost reduction and/or performance enhancement may be proposed. Voluntary alternatives are encouraged, but must be identified as "Voluntary Alternates" and detailed on unaltered Bid Forms contained herein. Voluntary Alternates may be further detailed and/or explained in attachments to the unaltered Bid Forms contained herein. Exceptions to the Request for Bid specifications must be clearly noted and explained for each Voluntary Alternate proposed.

B. No substitutions of specified products may be made without specific prior authorization by Designer and Owner. Individual bid divisions herein contain particular information related to acceptable manufacturer and product requirements.

C. Trade-in, equipment/license exchanges or other return allowances may be provided as a voluntary alternate. Trade-in, exchange or other return equipment allowances shall <u>not</u> be included in base bid amount.

PART 3 - EXECUTION

3.01 EXAMINATION OF DOCUMENTS AND SITE

A. Bidders shall carefully examine the Contract Documents and the construction site to obtain first-hand knowledge of existing conditions and requirements. No plea of ignorance of conditions that exist, or any other relevant matter

concerning work to be performed in the execution of work will be accepted as justification for failure to fulfill every detail of all requirements as described herein.

3.02 QUESTIONS, INTERPRETATIONS AND ADDENDA

A. Any bidder finding discrepancies between Drawings, Specifications and/or Bid Documents, or be in doubt as to the exact meaning of any provision or detail shall notify the Designer at once, and before the deadline for Questions and Clarifications. The Designer may then, at their option, issue Addenda clarifying same. The Designer is not responsible for oral instructions, or Bidder's/Contractor's misinterpretations of Drawings, Specifications and/or Bid Documents.

B. The Designer reserves the right to issue Addenda at any time up to thirty-six (36) hours prior to the scheduled bid opening. All such addenda shall become, upon issuance, an inseparable part of the Specification/Contract Documents. Each bidder shall incorporate within their bid all costs for items listed in any/all Addenda, and shall acknowledge receipt and identifying number of each Addendum on the Bid Form and on the outside of the sealed bid container.

C. Addenda will be forwarded to each bidder who has received a copy of the Bidding Documents and has submitted "Intent to Bid Form".

3.03 BID SECURITY, BONDS AND INSURANCE

A. Bid Security, Performance and Payment Bonds are required on this project.

1. Bid security equal to five percent (5%) of the bid amount must accompany each bid in accordance with the Instruction to Bidders.

a. Bid security shall be either a Bid Bond issued by a company licensed in the State of Michigan to furnish bid security or Certified Check made payable to the Owner.

B. The selected Contractor will be required to provide a performance bond and a payment bond each in an amount equal to one hundred percent (100%) of the bid amount including any accepted alternates at the Owner's discretion.

1. The surety of the performance bond shall remain in effect until all acceptances and final contract close-out requirements herein have been executed by the Owner.

C. Contractor shall provide, prior to beginning any work at the sites, certificate of insurance for delivery to Owner indicating all required insurance coverage is in force.

1. Workers' Compensation and Employer's Liability Insurance

    a. Coverage A – Statutory

    b. Coverage B - $1,000,000 Per Accident

2. Broad Form Comprehensive General Liability Insurance (including – Premises, Elevators, Contractor's Protective Liability, Contractual, Products & Completed Operations – including Broad Form Extensions).

    a. Each Occurrence - $1,000,000

    b. General Aggregate - $2,000,000

    c. Products & Completed Operation Aggregate - $2,000,000

    d. Personal Injury & Advertising Injury - $1,000,000

    e. Fire Legal - $100,000

3. Sub-contractors Operations, Products – Completed Operations and Contractual Liabilities, plus such excess coverage as may be appropriate for the limits listed.

4. Comprehensive Automobile Liability Insurance (owned, hired, and non-owned automobiles).

    a. Bodily - $1,000,000 each Person and $1,000,000 each Occurrence

    b. Property Damage - $1,000,000

5. Furnish Owner with Contingent Liability Insurance Policy with coverage and liability limits the same as for Public Liability Insurance specified herein. Designate on policy as assured, only the Owner.

6. Furnish Owner with Contingent Property Damage Insurance Policy with coverage and liability limits the same as for Property Damage specified herein. Designate on policy as assured, only the Owner.

7. Policies shall include notification clause requiring ninety (90) days written notice to Owner in the event of policy cancellation, expiration, non-renewal, coverage reduction or other material change.

8. Contractor shall not commence work under the Contract until after all insurance required herein has been obtained and certificates for such are approved by Owner.

D. All such bonds and/or insurance shall be issued by surety licensed by the State of Michigan and acceptable to the Owner.

1. Insurance certificate(s) shall be signed by insurance agent licensed in the state of Michigan or a representative of the insurance company.

E. Contractor agrees to indemnify and hold harmless the Owner and Designer, including their agents and employees, from and against all claims, damages, losses and expenses, including, but not limited to, attorney fees arising out of, or resulting from the performance of the work to the fullest extent allowed by law on a comparison basis of fault.

3.04 MODIFICATION AND WITHDRAWL

A. Bids may be withdrawn and/or changed any time prior to the deadline for submission of bids. Bids may not be withdrawn or changed thereafter and shall be deemed a form offer continuing for ninety (90) calendar days. Bids receive after the deadline for submission will be returned unopened at the Owner's discretion.

B. Withdrawal of any Bid after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.

3.05 CODES, ORDINANCES, REGULATIONS AND RELATED

A. All labor and materials shall be furnished and installed in strict accordance with the latest applicable codes, ordinances and regulations of any governing body having jurisdiction over this project.

B. In the event the quality of labor and materials required by the Drawings and Specifications herein exceeds requirements of current applicable codes, ordinances and regulations, the Drawings and Specifications shall take precedence.

C. In the event the quality of labor and materials required by current applicable codes, ordinances and regulations having jurisdiction over this project exceeds that of the Drawings and Specifications herein, the applicable codes, ordinances and regulations shall take precedence.

D. The Contractor shall give all notices and comply with all codes, laws, ordinances, rules and regulations of any authority having jurisdiction, which bears on the performance of its work. This compliance includes, but is not limited to, the Michigan School Safety Initiative (PA129, PA130, PA131 and PA138) if applicable to work being performed.

E. The Contractor shall pay for all licenses, permits, taxes, and fees required for this project; and shall comply with all federal, state, local and Owner's codes, laws, ordinances, regulations and other requirements applicable to the work specified at no additional cost to the Owner. Contractor shall submit copies of all approved certificates and approvals to the Owner upon receipt.

3.06 SUB-CONTRACTOR AND MATERIAL SUPPLIER

A. The successful Bidder shall submit to the Owner and Designer a complete list of all sub-contractors and all material suppliers proposed to engage on the work. Sub-contracts shall not be awarded until after they have been approved by the Designer and Owner.

B. Finalist bidders may be required to submit additional details related to sub-contractors and suppliers within forty-eight (48) hours after the bid opening.

C. Names of any principal sub-contractors must be listed on the Bid Form.

D. All contracts made by the successful Bidder with Subcontractors shall be covered by the terms and conditions herein. The successful Bidder shall see to it that Subcontractors are fully informed in regard to these terms and conditions, and shall bind all subcontractors to the same terms and conditions. Failure to do so will absolve the Owner from any liability for additional cost due to subcontractor claims for additional cost, time or any claim(s) for additional cost by subcontractor(s).

3.07 BID RESPONSE FORMAT

A. Bidder shall provide complete Bid copies in two formats as described herein.

1. One (1) Hard copy format responses shall be in a bound tabulated format. Each response shall have tab indicators for each section.

2. One (1) Electronic copy format responses shall be submitted on a USB Drive, readable by a standard Microsoft Windows 10 workstation. Electronic media shall contain separate folders to organize response documentation as described herein. Files submitted electronically shall be ***Adobe Acrobat*** "PDF" format (SCHEDULE OF VALUES is additionally required to be on the disk in the appropriate folder as a spreadsheet and as described herein).

B. All Bid Response formats shall be clearly externally marked to include, but not be limited to:

1. Bidder identification.

2. Project Owner identification.

3. Project name.

4. Bid submission date.

C. Bid Responses shall include an index containing copies/PDF of a complete index of documents comprising Bid Response. Responses shall include, but not be limited to the following tabbed/folder sections:

1. Section 1 – Forms, which shall contain copies/PDF files of all required and completed bid forms.

    a. BID FORM

    b. Michigan Familial Relationship Disclosure Statement

    c. Iranian Linked Business Affidavit

    d. REFERENCES

    e. CONTRACT EXCEPTIONS

    f. SCHEDULE(s) OF VALUES

    g. BID BOND

2. Section 2 – Overview, which shall contain copies/PDF files of cover letter and/or executive overview.

3. Section 3 – Submittals, which shall contain copies/PDF files of all required and voluntary submittals.

4. Section 4 – Appendices, which shall contain copies/PDF files of other reference materials Bidder wishes to, or is required to submit.

3.08 AWARD OF CONTRACT

A. The material proposed to be used for the completion of work, and the competency, solvency and responsibility of bidders will receive due consideration before award of contract. In the reception of bids for this work, the Owner incurs no obligation to accept the lowest, or any bid submitted. The right to accept or reject any and all bids or portion thereof is reserved by the Owner. The Owner reserves the right to require testimonial, accounting or legal documents pertaining to the solvency of a Contractor, or any other decision factor the Owner deems appropriate, prior to award of contract.

B. Owner reserves the right to select individual components from schedule of values independent of installation as may be determined in Owners best interest. Selected bidder may be required to install selected components provided by others.

C. Issuance of a Purchase Order by Owner in response to a valid bid shall be a Notice to Proceed, and shall become part of, but not limited to, all terms,

conditions and requirements herein. Notice to Proceed shall have the full effect of contract award, and shall make all terms, conditions, requirements and responsibilities of Bidder binding upon issuance. Notice to Proceed, once issued, shall become an inseparable part of the contract documents herein, and constitute both Bidder and Owner's acceptance of contract.

3.09 TIME, SCHEDULES, PROJECT MANAGEMENT, MEETINGS AND PLANS

A. Time is of the essence on this project. Award of contracts for this project will be contingent on the bidder's agreement to complete the work on or before the contract completion date stated herein.

B. All Contractors will commence work in such a manner and at such a time as to expeditiously interface with the work of other Contractors, and will pursue the project diligently to completion. All Contractors will work in a cooperative manner with Owner and other Contractors.

C. Contractor shall appoint an overall Project Manager acceptable to Owner, with skills and experience deemed appropriate by the Owner for the scope and size of the project. Project Manager shall be responsible for the scheduling of all Contractor resources and attending all project meetings. Upon notification of Bidder being considered a finalist, the Bidder shall submit professional resume of proposed Project Manager within forty-eight (48) hours.

1. Project meetings shall be conducted at Owner's selected and identified location weekly and at Owner's and/or Designer's discretion.

2. Within five (5) days of Notice to Proceed (issuance of a Purchase Order by the Owner), Contractor's Project Manager shall provide to the Owner a critical flow path in the form of a "Gantt Chart" (or equivalent) indicating the proposed sequence of events and approximate beginning and completion dates in accordance with, compliance to, and coordinated with requirements herein.

3. Changes of the Project Manager during the project shall not be acceptable without prior written approval from the Owner.

4. It is the responsibility of the Contractor's Project Manager to schedule work, work out issues, ensure that all required products and services are delivered according to schedule and attend to any other matters required by the Owner in the interest of professional and timely completion of the project.

5. The appointed Project Manager, or a designee acceptable to the Owner, shall be in attendance of all project meetings throughout the term of the project. Failure to do so may be considered a material breach of contract.

6. After a ten (10) business day notice, the Owner reserves the right to request a new Project Manager, when it appears that, in the Owner's sole discretion, the Project Manager is not fulfilling the full responsibilities of the position. Failure by Contractor to provide adequate Project Manager meeting requirements of the Owner, may result in Contract termination.

3.10 CHANGES IN THE WORK

A. No changes in work with the effect of either increasing or decreasing in the project value shall be made without specific and prior authorization by the Owner and Designer.

B. Owner, without invalidating the contract and without notice to any surety, may at any time order extra work or make changes by altering, adding to or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be authorized by a written Change Order approved by Owner and Contract Designer. Upon receipt of such an order Contractor shall promptly proceed with the work involved. All such work shall be executed under the conditions of the original Contract. Owner authorized change order(s) may be issued at any time prior to Contract close out.

C. When so directed, Contractor shall promptly submit an itemized estimate and a unit price for performing or deleting such extra or changed work as may be contemplated. Any extensions or reductions of the contract time associated with extra or changed work shall be identified at the time Contractor submits such documentation.

D. At the Owner's discretion, adjustments in the Contract Sum shall be determined by one or more of the following methods:

1. By mutual acceptance of a lump sum cost, including overhead and profit, itemized and supported by sufficient substantiating data to permit evaluation.

2. By unit prices stated in the Contract Documents including, but not limited to, Schedule of Values.

3. By unit prices mutually agreed upon.

3.11 PAYMENT REQUESTS AND PAYMENTS

A. Contractor's invoices shall be submitted monthly in correlation with the Project Schedule indicating percentage of work completed.

B. All contract and change order invoices shall be sent directly to Contract Designer.

C. A 10% retainage shall be held back on all payment requests, including, but not limited to hardware, software, change orders and services, until final completion and close out of the project or project phase as determined by Owner and Designer.

D. Contractors are required to submit all invoices on approved AIA Payment Request Forms or other billing format pre-approved by Contract Designer. Each AIA Payment Request Form shall be accompanied by a properly completed, executed and notarized Waiver of Lien which shall be in a format and contain verbiage approved by Owner.

E. The Contract Designer and Owner shall process payment requests on a monthly schedule and in accordance with their respective established processes and procedures. Payments will be made by the Owner based only on AIA Request Forms having been previously certified, audited and approved by Contract Designer and accompanied by acceptable Waiver of Lien.

END OF SECTION

SECTION 00 65 00
CONTRACT CLOSE OUT

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide an orderly and efficient transfer of the completed work to Owner.

B. Details affecting work of this Section includes but is not limited to all other Sections herein and all related Contract Documents.

C. Activities relative to Contract close-out are described in, but not limited to, this and other Sections of this document.

1.02 SUBSTANTIAL COMPLETION

A. "Substantial Completion" shall be defined as:

1. All responsibilities of Contractor for all provisions and requirements of all divisions and sections of complete Contract herein, and as amended, are properly and fully completed or properly, accurately and acceptably provisioned for.

2. All systems, equipment, facilities, services, programming and/or components required by all divisions and sections of complete Contract are fully operational, acceptable and useful to the Owner for their intended purposes.

B. Prior to requesting inspection by Designer to certify Substantial Completion, Contractor shall use adequate means to assure the Work is completed in accordance with the specified requirements and is ready for such inspection.

PART 2 - MATERIALS

2.01 NOT USED FOR THIS SECTION

PART 3 - EXECUTION

3.01 PROCEDURES

A. Contractor shall submit a written request to Designer indicating they have achieved Substantial Completion of Work.

B. Within a reasonable time after receipt of the request, Designer will inspect Work to determine status of completion.

C. Should Designer determine the Work is not substantially complete:

1. Designer promptly will so notify Contractor, in writing giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.

2. Contractor shall then expeditiously remedy the deficiencies and notify Designer in writing when ready for re-inspection.

3. Designer will re-inspect the Work.

4. Excessive re-inspections of Work may result in fees being assessed Contractor.

D. Should Designer concur the Work is substantially complete:

1. Designer will prepare a letter of Substantial Completion.

2. Designer will submit the letter to Owner and Contractor.

3. Contract shall be deemed “Closed Out” for retainage purposes.

4. Final Acceptance of the system shall be deemed complete.

END OF SECTION

SECTION 11 61 33
STAGE EQUIPMENT - RIGGING AND DRAPERIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Curtains and Rigging Systems:
   1. Counterweight rigging.
   2. Stage curtains and tracks.

1.2 RELATED SECTIONS

A. Section 11 61 63 – Theatrical Lighting Systems

B. Section 11 61 73 – Theatrical Lighting Fixtures

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Rated capacities, construction details, material descriptions, dimensions of individual components, profiles, and finishes.

C. Shop Drawings:
   1. Submit component and project specific installation drawings, cut sheets, and schedules showing all information necessary to fully explain the design features, appearance, function, fabrication, installation, and use of system components in all phases of operation. Submit for approval before beginning any fabrication, installation, or erection.
   2. Include fabrication and installation details. Distinguish between factory and field work.
   3. Include plans, elevations, sections, attachments and work by other trades.
   4. Include wiring diagrams when applicable.
   5. Indicate seismic bracing and fastening requirements as applicable.
   6. For theater seating, develop sightline plan and sections through seating areas using sightlines program and sightline rules. Include options placement, electrical schematic for aisle lighting and placement of seating with table arms as applicable.

D. Coordination Drawings: Project-specific Coordination Drawings, indicating the following items drawn and coordinated with each other. Include information required by Installers of each item in order to coordinate the Work. Include the following:
   1. Relationship of items shown on separate Shop Drawings.
   2. Dimensions and required clearances of adjacent or related work.
   3. Order of assembly of separate items.
   4. Information required for interface with other trades and components, including mechanical, electrical, and communication work.

E. Product Schedule:
   1. Use designations indicated on the Drawings.
   2. Include room locations, dimensions, accessories, finishes, and project specific notes.

F. Verification Samples:
   1. Exposed Finishes and Finish Materials: Not less than 4 by 4 inches (102 by 102 mm), for each type, color, pattern, surface and material selected.

G. Closeout Submittals:
   1. Operation and Maintenance Data: For adjusting, repairing and replacing components and accessories.
   2. Warranty: Submit manufacturer's warranty.
   3. As-Built Drawings: For completed work.

H. Field Quality Control Reports: Documenting inspections and demonstrations of installed products and equipment.

1.4 QUALITY ASSURANCE

A. Curtain and Rigging Systems, Manufacturer Qualifications: Minimum 5 years experience in manufacture of similar products in use in similar environments, including project size, and complexity, and with the production capacity to meet the construction and installation schedule.
   1. Theatrical rigging systems are specialized overhead lifting systems. Due to the highly specialized nature of theatrical rigging equipment, and the safety requirements of the equipment, the rigging products provided for this work shall be the products of a single rigging manufacturer for quality, consistency and ease of integration. Accessory items such as wire rope, fittings, and curtain tracks may be from other specialty manufacturers.
   2. The rigging manufacturer shall have the following programs in place.
      a. The manufacturer shall have a product testing program, including determination of recommended working loads for products based on destructive testing and review by a licensed engineer.
      b. The manufacturer of the performance equipment shall have a quality management system that is registered to the ISO 9001standard.
      c. The manufacturer shall carry primary product and general liability insurance of $2,000,000 each, with excess liability coverage of $10,000,000 and a Contractors Professional Liability policy with $2,000,000 coverage.

B. Rigging Systems, Installer Qualifications: Manufacturer's authorized representative, trained and approved for installation of units required for this Project.
   1. The Rigging Contractor shall be an approved rigging manufacturer or an authorized representative or dealer of an approved manufacturer. The contractor shall have been installing stage rigging systems for a period of five years or more, and shall have completed at least ten installations of this type and scope. The AHJ shall be the final judge of the suitability of experience.
   2. The Rigging Contractor shall employ an Entertainment Technician Certification Program (ETCP) Certified Theatre Rigger. A Certified Rigger shall be either the project manager or site foreman, and be responsible for the overall project including the layout, inspection, and onsite user training.

C. Rigging Systems, Minimum Standards of Safety, the following factors shall be used:
   1. Cables and Fittings: 8:1 Safety Factor.
   2. Cable D/d ratio: Sheave tread diameter is the minimum D/d ratio per the "Wire Rope User Manual" or recommended by the wire rope manufacturer.
   3. Tread Pressures: 500 lbs. for cast iron, 900 lbs. for Nylatron, 1000 lbs. for steel.
   4. Maximum Fleet Angle: 1-1/2 degrees.
   5. Steel: 1/5 of yield strength or per AISC Specification.
   6. Bearings: Two times required load at full speed for 2000 hours.
   7. Bolts: Minimum SAE J429 Grade 5 (ISO R898 Class 8.8), zinc plated.
   8. Motors: 1.0 NEMA Service Factor.
   9. Gearboxes: 1.25 Mechanical Strength Service Factor, 1.0 Gearing Service Factor.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original unopened containers with manufacturer's labels attached. Do not deliver material until spaces to receive them are clean, dry, and ready for their installation. Ship to jobsite only after roughing-in, painting and other finishing work has been completed, installation areas are ready to accept work.

B. Handle and install materials to avoid damage.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install materials until spaces are enclosed and weather tight, wet work in spaces is complete and dry, HVAC system is operating and maintaining ambient temperature at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify field measurements as indicated on Shop Drawings. Where measurements are not possible, provide control dimensions and templates.
   1. Coordinate installation and location of blocking and supports as requested.
   2. Verify openings, clearances, storage requirements and other dimensions relevant to the installation and final application.
   3. Where applicable, coordinate locations of electrical junction boxes.

C. Field Measurements: Verify field measurements as indicated on Shop Drawings. Where measurements are not possible, provide control dimensions and templates.
   1. Coordinate locations of electrical junction boxes.

D. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.7 WARRANTY

A. Special Warranty for Curtain Systems: Provide manufacturer's standard limited 3 year warranty against defects in materials or workmanship from the date of Substantial Completion. The warranty is contingent on inspection of the equipment and training of its use being provided annually by an Entertainment Technician Certification Program (ETCP) Certified Theatre Rigger at the Owner's expense. It is the responsibility of the end user to make arrangements for the annual inspection and training. Failure to obtain the inspection and training annually shall result in a one year warranty. The warranty shall not cover equipment that has become defective due to misuse, abuse, accident, act of God, alteration, vandalism, ordinary wear and tear, improper maintenance, or used not in a manner intended.

B. Special Warranty for Rigging Systems: Provide manufacturer's standard limited 3 year warranty against defects in materials or workmanship from the date of Substantial Completion. The warranty is contingent on inspection of the equipment and training of its use being provided annually by an Entertainment Technician Certification Program (ETCP) Certified Theatre Rigger at the Owner's expense. It is the responsibility of the end user to make arrangements for the annual inspection and training. Failure to obtain the inspection and training annually shall reduce warranty coverage to one year after substantial completion. The warranty shall not cover equipment that has become defective due to misuse, abuse, accident, act of God, alteration, vandalism, ordinary wear and tear, improper maintenance, or used not in a manner intended.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Requests for substitutions shall be considered in accordance with provisions of Section 01

60 00 - Product Requirements.

1. Manufacturers seeking approval shall submit the following:
    a. Product data, including third-party certified acoustical data and proposed graphic/drawing layout for this project.
    b. Project references: Minimum of 5 installations not less than 3 years old, of comparable size, scope and complexity of this project, complete with owner contact information.
    c. Sample warranty.
2. Submit substitution request not less than required days prior to bid date.
3. Approval shall be indicated by issuance of written Addendum.
4. Approved manufacturers shall meet separate requirements of Submittals Article.
5. Manufacturers' products that are either listed as pre-approved in these Specifications or who have been granted approval as an alternate must still demonstrate all of the material performance and operational characteristics required by this Section.

B. Rigging Systems, Requirements for Approval: Other equipment manufacturers seeking approval shall submit the following information at least 2 weeks prior to the bid opening date. Approval of manufacturers shall be by addenda. Failure to submit any of the required information shall automatically disqualify the manufacturers from consideration of approval.

1. Evidence that the manufacturer has been in business for a minimum of ten years manufacturing stage equipment.
2. A listing of 10 equivalent installations, including:
    a. Name, address and telephone number of owner.
    b. Name, address and telephone number of architect.
    c. Scope of work.
3. A brief written description of the manufacturer's operation including facilities, financial capabilities, and experience of key personnel.
4. Written, third party evidence showing that the manufacturer has the testing, quality management and insurance programs required above in place.

2.2 COUNTERWEIGHT RIGGING

A. Wire Guide - Arbor.

1. Arbor shall be of specified length, or long enough to accommodate counterweights to balance its pipe batten and related equipment, whichever is longer.
2. The arbor top shall be a fabricated weldment of 1/2 inch (12.7 mm) steel plate and 7 gauge (4.76 mm) formed side plates. The side plates shall be punched to receive 8 cables, and shall be tied together with a bolt and spacer providing a tie-off point for the hand line.
3. The arbor bottom shall be 1/2 inch x 3 inch (12.7 mm x 76.2 mm) steel bar with counterweight rests to keep the weights from resting on the inner arbor rod nuts, and a forged steel eye for the hand line tie off.
4. The top and bottom of the arbor shall be tied together by means of two 3/4 inch (19.05 mm) steel arbor rods. The arbor rods shall have three nuts at each end, the outermost being a lock nut.
5. The top and bottom shall have smoothed and rounded 3/8 inch (9.52 mm) holes for 1/4 inch (6.4 mm) diameter guide wires located on 15 inch (381 mm) centers.
6. Provide 12-gauge (2.78 mm) spreader plates (two minimum) on arbor rods so they can be spaced between counterweights on 2ft (609.6 mm) centers. Provide a retaining collar on each rod, each with a 1/4 inch (6.4 mm) set screw with red plastic knob for easy locking. The front retaining collar shall be welded to the top spreader plate.
7. The arbor shall be guided by 1/4 inch (6.35 mm) diameter wire ropes when installed. The guides shall be tensioned with turnbuckles tightened to prevent excessive play in the arbor travel but not so tight as to over stress the attachment points of the cables.

B. Floor Block: Nylon Fixed Combination Floor Block.
   1. The sheave shall have an 8 inch (203.2 mm) outside diameter and shall be filled nylon. The sheave shall be equipped with a 17 mm (0.67 inch) diameter shaft and two sealed, precision ball bearings.
   2. Side plates shall be a minimum of 12-gauge (2.78 mm) steel, and shall fully enclose the sheave.
   3. The included rope lock shall consist of an ASTM A536 ductile iron housing, cams and handle. The cams shall compress the rope, not bend it over a tight radius corners that reduce its strength. The housing shall allow the use of a standard padlock to hold the handle in its closed position. There shall be a rubber bumper in the housing to silence the handle when it is opened.
   4. Adjustment for rope shall be from 5/8 inch to 1 inch (15.87 mm to 25.4 mm) by means of a 1/2 inch (12.7 mm) nylon tipped, socket head adjustment screw with lock nut at the rear of the housing.
   5. The handle shall be 9 inch (228.6 mm) long with a nylon powder or vinyl dip coating. The handle shall be installed so that it passes two degrees past vertical to lock the hand line. A coated, oval, welded steel ring shall be provided as a safety lock. The outer end of the handle shall be slotted to accommodate a safety padlock.
   6. The rope lock and floor block shall be mounted to a 1/2 inch x 4 inch (12.7 mm x 101.6 mm) formed steel frame, which incorporates tie off points for guide wires.

2.3 STAGE CURTAINS AND TRACKS

A. Stage Curtains:
   1. Description and Sizes: As shown on drawings.
   2. Fabric Types:
      a. Fabric: 22 oz. Opaque Prism, 100 percent polyester IFR Black Velour, Manufactured by Fred Krieger, or Equal.
   3. Flame Resistance:
      a. All Polyester fabrics are woven from fibers that are inherently flame retardant for the life of the fabric. These curtains never need to be re-treated for flame retardancy.
      b. 100 percent cotton fabrics are to be chemically mill treated by an immersion process. This process lasts approximately 5 years and then shall be re-done for flame retardancy according to the requirements of the National Fire Protection Association's NFPA #701 together with dry cleaning.
      c. A Certificate of Flame Resistance is to be provided for each fabric supplied. The certificates shall be issued by the fabric manufacturer or converter. Certificates issued by the supplier or fabricator are not acceptable.
      d. Each curtain is to be labeled with a permanent tag giving the flame retardancy information and providing a suggested date for testing, if applicable.
   4. Fabrication:
      a. General: Curtains are to be fabricated in the sizes and fabrics shown in the curtain schedule. Curtains are to be stitched with thread matching the color of the curtain using a single needle lock stitched. No less than full widths of fabric are to be used in leg curtains. All fabrics with a grain or pile shall have all strips running in the same direction.
      b. Fullness: Fullness as listed in the Curtain Schedule is to be in addition to allowances for seams, side hems and turn backs.
      c. Pleats: Where fullness is indicated in the Curtain Schedule, pleats shall be box type on 12 inch (305 mm) centers. Valances and borders are to have their pleats arranged to conceal the seams.
      d. Top Finish: 3-1/2 inch (89 mm) jute webbing or 3 inch (76 mm) Poly webbing shall be double stitched to the top of the curtain with 2 inch (50.8 mm) of face fabric turned under the webbing. Brass rustproof grommets shall be inserted in pleat centers (12 inch (305 mm)) centers on flat curtains.

e. Track-mounted curtains shall be supplied with plated wire S-hooks or CCF-2 curtain to carrier snap hooks. Batten-mounted curtains are to be supplied with 36 inch (914 mm) braided #4 cotton tie lines. Tie lines shall be black or white to best match the curtains with the center line in an alternate color to aid in hanging curtains.

f. Bottom Hems:
   1) Valances and borders shall have 4 inch (102 mm) bottom hems.
   2) All full height curtains shall have 6 inch (152 mm) bottom hems complete with separate interior chain pockets filled with #8 plated jack chains. Chain pockets shall be stitched so that the chain shall ride 2 inch (51 mm) above the finished bottom edge of the curtain.
   3) Scrims, drops and cycloramas shall have an additional strip of webbing with ties on 12 inch (305 mm) centers sewn to the back of the hem and shall be furnished with a 3/4 inch (19 mm) pipe batten, threaded and coupled every 10 feet-0 inch (305 mm).

g. Side Hems:
   1) All lined traveler curtains shall have 1/2 width of face fabric turned back at the leading edge.
   2) All other side hems shall be 2 inch (51 mm).

h. Lining: Lining, if required in the above listing, shall conform to the following requirements.
   1) Lining shall be in the same fullness as face fabric.
   2) Lining shall finish 2 inch (51 mm) shorter than face fabric.
   3) Lining shall be attached to the face fabric along the sides and bottom hems by 4 inch (102 mm) twill tape.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine installation areas and mounting surfaces with Installer present, for compliance with manufacturer's installation tolerances including required clearances, floor level, location of blocking and anchoring reinforcements, and other existing conditions that may affect installation or performance.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Proceed with installation only after correction of unsatisfactory conditions.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION - GENERAL

A. Install manufactured units in accordance with manufacturer's recommendations, approved submittals, and in proper relationship with adjacent construction.

B. Clean exposed surfaces. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

3.4 INSTALLATION OF RIGGING SYSTEMS

A. Equipment shall be installed by fully trained superintendents and workmen. The Rigging Contractor shall employ Entertainment Technician Certification Program (ETCP) Certified theatre Riggers. Certified Riggers shall, at a minimum, be used as the project manager and site foreman and be responsible for the overall project including the layout, inspection, and onsite user training.

B. Equipment shall be installed per plans and specifications. Equipment shall be aligned, adjusted, and trimmed for the most efficient operation, the greatest safety and for the best visual appearance.

C. Standards: Installation practices shall be in accordance with OSHA Safety and Health Standards and all local codes. All welding shall be performed in full compliance with the latest edition of the Structural Welding Code (ANSI/AWS D1.1).

D. Alignment: Mule blocks, cable rollers and guides shall be installed, as required, to provide proper alignment, to maintain specified fleet angles, and to prevent contact with other surfaces.

E. Attachments: All equipment shall be securely attached to the building structure.

3.5 INSPECTION AND TESTING OF RIGGING SYSTEMS

A. Inspection: During the installation of equipment the Rigging Contractor shall arrange for access as necessary for inspection of equipment by the Owner's representatives.

B. System Pre-Testing By Rigging Contractor: On completion of installation the Rigging Contractor shall conduct a complete test of the system to ensure it is working properly and in conformance with this specification.

C. Completion Testing: Upon completing the installation, the Rigging Contractor shall notify the Owner or Owner's Representative, who shall schedule inspection and testing of the full rigging system. At the time of testing, the Rigging Contractor shall furnish sufficient workers to operate all equipment and to perform such adjustments and tests as may be required by the Owner's representative. All testing equipment and personnel shall be at the Rigging Contractor's expense. Any equipment, which fails to meet with approval, shall be repaired or replaced with suitable equipment and the inspection shall be re-scheduled under the same conditions as previously specified. At the time of these inspections, no other work shall be performed in the auditorium and stage areas. All temporary bracing, scaffolding, etc. shall be removed to permit full operation of, and access to, all equipment. Final approval shall be withheld until all systems have been thoroughly tested and found to be in full working order and meets requirements herein.
   1. Manual counterweight rigging shall be tested in accordance with ANSI E1.4 "Entertainment Technology Manual Counterweight Rigging Systems".
   2. Powered rigging shall be tested. Each hoist shall be operated over five full continuous cycles at 1.25 times its full working load at full speed and travel distance. The emergency stop function shall be tested at 100 percent WLL in both the ascending and descending directions.
      a. Demonstrate that all over travel limit switches have been correctly set for the actual field conditions of the specific project.
      b. If it applies to the project, demonstrate that all position encoders have been correctly set for the actual field conditions of the specific project.
   3. Provide written recommendations to the Owner for necessary repairs or changes not included in the warranty. Provide a copy to the rigging equipment Manufacturer and in the Operations Manual.

D. The Owner or Owner's Representative shall witness and sign off on the inspection. A copy of the certificate shall be included in the permanent log turned over to the owner.

E. Upon completion of the work, the Rigging Contractor shall submit 3 copies of a comprehensive Operating and Maintenance Manual including as-built shop drawings, equipment descriptions, and parts lists. The Rigging Contractor shall provide a safety and instruction class with personnel designated by the owner to demonstrate and explain the operation and maintenance of the systems.

F. Signage with basic operating instructions and warnings shall be posted in the area where the equipment shall be operated. Signage shall be in conformance with ANSI-Z535.

3.6 RIGGING SYSTEMS, FOLLOW-UP INSPECTION

A. The Contractor shall return to site 12 months and 24 months after system turnover and provide the following services:
   1. Inspection in accordance with ANSI E1.4-1 Entertainment Technology - Manual Counterweight Rigging Systems, ANSI E1.6-1 Entertainment Technology - Powered Hoist Systems, and ANSI E1.47 - Recommended Guidelines for Entertainment Rigging System Inspections.
   2. Make all required adjustments.
   3. Correct all warranty items and provide a written report to the Owner and Manufacturer.
   4. Provide written recommendations to the Owner and Manufacturer for necessary repairs or changes not included in the warranty.
   5. Conduct a rigging operation and safety class.
   6. Subsequent to the 24 month inspection, provide a written proposal for the following year's inspection.

3.7 FIELD QUALITY CONTROL

A. Inspect installed work to verify compliance with requirements.
   1. Verify that HVAC work and electrical work complies with manufacturer's submittals and written installation requirements.
   2. Perform installation and startup checks as recommended by manufacturer.
   3. Prepare inspection reports and submit to Architect.

3.8 DEMONSTRATION

A. Train Owner's personnel to adjust, operate, and maintain equipment. Turn over keys, tools, and operation and maintenance instructions to Owner.

3.9 CLEANING AND PROTECTION

A. Repair or replace defective work as directed by Architect upon inspection.

B. Clean surfaces. Touch up marred finishes or replace damaged components that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by manufacturer.

C. Protect installed products from damage, abuse, dust, dirt, stain, or paint until completion of project. Do not permit use during construction.

END OF SECTION

LUDINGTON HS Section 11 6133			
STAGE EQUIPMENT - RIGGING AND DRAPERIES			
Appendix A			
QTY	MAKE	MODEL	DESCRIPTION
RIGGING SYSTEMS			
9	Clancy	007-85x06	6' Wire Guided Arbor
9	Clancy	600-10818 NTS	Floor Block/Rope Lock Combo
500' +/-	All Line	Ultra Locrite Rope	Purchase Line - 3/4"
180	Clancy	021-250C	1/4" Forged Cable Clip
As Needed	Clancy	020-250	1/4" Galvanized Utility Cable
As Needed	Clancy	Batten Trim Chains, 1/4" Shackles, 1/4" Thimbles	
NOTE: Existing Head & Loft Blocks to be Reused			
DRAPERIES			
2	Fred Krieger Fabrics	22'-0" x 34'-0" Main Traveler	22oz IFR Prisim Velour - Black
1	Fred Krieger Fabrics	Main Valance	22oz IFR Prisim Velour - Black
2	Fred Krieger Fabrics	Valance Tabs	22oz IFR Prisim Velour - Black
2	Fred Krieger Fabrics	Midstage Traveler	22oz IFR Prisim Velour - Black
As Needed		New Carriers for Main Traveler. Existing Carriers for Mid-Stage Traveler to be Reused.	
STRUCTURAL STEEL AND HARDWARE			
It is the responsibility of the installing contractor to include costs for all other required structural steel and hardware to complete this installation in the Base Bid.			
SHIPPING AND INSTALLATION			
SHIPPING: Base Bid to include all shipping charges to the job site.			
INSTALLATION: Base Bid to include all demo and new product installation charges to include (But Not Limited To) the Removal and disposal of nine (9) existing wire guided arbor systems and the installation of nine (9) new, wire guided Arbor Systems as per specification (NOTE: Existing Head & Loft Blocks to be Reused). Base Bid to also include System Testing and User Training.			

SECTION 11 61 63
STAGE EQUIPMENT - THEATRICAL LIGHTING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Entertainment controls.
   1. Eos.
   2. Multiverse.
   3. Response.

B. Software. (Eos)

C. Power Controls.
   1. Power control enclosures (Sensor, Sensor IQ, DRd, ERP, ERPA, ERP-FT).

1.2 RELATED SECTIONS

A. Section 11 61 33 – Stage Equipment – Rigging and Draperies

B. Section 11 61 73 – Theatrical Lighting Fixtures

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00 Administrative Requirements.

B. Product Data:
   1. Manufacturer's data sheets on each product to be used.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Typical installation methods.

C. Verification Samples: Two representative units of each type, size, pattern, and color.

D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.5 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: ETC, Inc., which is located at: 3031 Pleasant View Rd. P. O. Box 620979; Middleton, WI 53562-0979; Tel: 608-831-4116; Fax: 608-836-1736; Email: request info (mail@etcconnect.com); Web: http://www.etcconnect.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 Product Requirements.

2.2 ENTERTAINMENT CONTROLS (EOS)

A. Product: Ion XE 20 as manufactured by ETC Inc.
   1. Model Ion Xe 20 2K: Ion Xe 20 console, 2,048 outputs (base)
   2. Power consumption: Approximately 2 A at 120 V or 230/240 V.
   3. Ambient Room Temperature: 32 to 95 degrees F (0 to 35 degrees C).
   4. Ambient Humidity: Up to 90 percent non-condensing.
   5. Regulatory Compliance: CE compliant, cETLus listed, UKCA marked, FCC compliant, RoHS compliant, and WEEE.
   6. Hardware and Interfaces:
      a. Supports two external display port monitors (1920 x 1080 min, 3840 x 2160 max). Optional single-touch or multi-touch screen control and DDC/CI support.
      b. Twenty 45 mm standard faders, 100 10-fader pages configurable as channels, submasters, palettes/presets, timing, and effect rate/speed playback control.
      c. Two internal monochromatic LCD displays for fader content.
      d. Main Playback with two 100 mm standard faders.
      e. Four encoders for non-intensity parameter control.
      f. Dedicated high-resolution intensity level wheel.
      g. Backlit Eos keypad.
      h. Included USB keyboard.
      i. Solid-state hard drive.
      j. IEC Power Input: 100 to 240 VAC at 50/60 Hz, fused mains power switch, locking regionalized power cable included.
      k. Two individually configurable Gigabit Ethernet ports, RJ45 connectors.
      l. One 802.11ac Wi-Fi Ethernet adapter. To be enabled with future software.
      m. Bluetooth 5.1 for connecting input accessories. To be enabled with future software.
      n. sACN and Art-Net network output protocols.
      o. Four DMX-512 / RDM 5-pin XLR ports.
      p. Contact closure triggers via D-Sub connector.
      q. USB 3.1 ports, for flash drives, pointing devices, keyboards.
         1) USB-A Ports: 5. USB-C Ports: 2
      r. One Littlite XLR port.
      s. One Kensington lock port.

t. Multiple MIDI and/or SMPTE timecode inputs, MIDI In and Out, Analog/Serial Inputs, OSC transmit/receive, UDP transmit/receive through network interface or Response Gateways.

B. Product: Element 2 as manufactured by ETC Inc.
1. Model Element 2 1K: Element 2 console, 1,024 outputs (base).
2. Power Consumption: Approximately 1.2 A at 120 V or 230/240 V.
3. Ambient Room Temperature: 32 to 95 degrees F (0 to 35 degrees C)
4. Ambient Humidity: Up to 90 percent non-condensing
5. Regulatory Compliance: CE compliant. cETLus listed. UKCA marked. FCC compliant. RoHS compliant. WEEE.
6. Hardware and Interfaces:
a. Supports two external display port monitors, 1920 x 1080 minimum to 3840 x 2160 maximum, with optional single-touch or multi-touch screen control and DDC/CI support.
b. 40, 45 mm standard faders. 100, 10-fader pages configurable as channels, submasters, palettes/presets, timing, and effect rate/speed playback control.
c. Dedicated fader paging knob, with backlit selection labels.
d. Main Playback with two 45 mm standard faders.
e. On-Demand moving light and LED virtual encoders on connected display monitor.
f. Dedicated high-resolution intensity level wheel.
g. Eos keypad.
h. USB keyboard: Included.
i. Solid-state hard drive.
j. IEC Power Input: 100 to 240 VAC at 50/60Hz.
1) Fused mains power switch and Locking regionalized power cable included.
k. Two individually configurable Gigabit Ethernet ports, RJ45 connectors.
l. One 802.11ac Wi-Fi Ethernet adapter to be enabled with future software.
m. Bluetooth 5.1 for connecting input accessories to be enabled with future software.
n. sACN and Art-Net network output protocols.
o. Four DMX-512 / RDM 5-pin XLR ports.
p. Contact closure triggers via D-Sub connector.
q. USB 3.1 ports, for flash drives, pointing devices, keyboards (5 USB-A ports, 2 USB-C ports).
r. One Littlite XLR port.
s. One Kensington lock port.
t. Multiple MIDI and/or SMPTE timecode inputs, MIDI In and Out, Analog/Serial Inputs, OSC transmit/receive, UDP transmit/receive through network interface or Response Gateways.

2.3 SOFTWARE FOR ENTERTAINMENT CONTROLS (EOS)

A. Lighting Control Desk: A microprocessor-based system providing control of stage, studio, and entertainment lighting systems.
1. Console Model: Ion Xe 20 2k as manufactured by ETC Inc.
2. Console Model: Element 2 1k as manufactured by ETC Inc.
3. Output: Ion Xe 20 2k: 2,048.
4. Output: Element 2 1k: 1,024.
5. The following items may be contained in non-volatile electronic memory and stored to an onboard solid-state hard drive or to any USB storage device.
a. Cues: 100,000. Cue Lists: 999. Groups: 10,000. Presets: 10,000 presets. Palettes: 4 x 10,000 (Intensity, Focus, Color and Beam)., Macros: 99,999. Effects: 10,000. Curves: 10,000. Color Paths: 10,000. Snapshots: 10,000.

6. Recorded cue lists: May be played back simultaneously on up to 200 faders.
    a. HTP/LTP intensity flags, assert, proportional, intensity master or manual master fade control and priority status may be placed on each cue list.
    b. A cue list may contribute to playback background states or to withhold such contributions.
7. Channels: Are to, by default, respond to cue information by last instruction, with discrete rate control provided for all cues.
8. The desk may be placed in Tracking or Cue Only mode by the user as a system default and overridden on individual record actions as required.
9. Control and programming features for automated fixtures: Include the following.
    a. Standard library of fixture profiles. The ability to copy and edit existing profiles and create new profiles. Patch displays including channel and output addressing. 24-bit fade resolution. Color characterization allowing color mixing and matching to color media data.
10. Displays: Three user definable work spaces, providing individually configured frames, with size/scaling controls.
11. Help Feature: Context sensitive. Explain and provide operation examples of system features. To be integrated into the on-board user manual via hyperlinks.
12. A fully integrated Virtual Media Server feature shall allow the user to map images and animations to a rig array. Forty such maps may be created, each with twelve layers. Systems that rely on external hardware or software for this functionality shall not be acceptable.
13. Fully integrated 3D visualization and programming environment included. Includes tools for programming fixed-focus and moving fixtures, including ability for straight-line focus moves, click-to-focus, and integration with personal device apps that allow finding the devices' location in real space and automatically adjusting moving fixtures to point at the location. The 3D environment receives its data from the internal programming of the lighting controller, not by monitoring the output levels being sent to the lighting system. The 3D environment displays a replica of live output to the lighting system, and displays recorded states in Blind, for the user to preview and modify the lighting states without changing live output to the lighting system.
14. Software Upgrades: By user via USB flash drive. Install software updates in all desks, processor units and video remotes from one device over the network.
15. The device operating software shall be loaded into program execution memory from the internal hard drive when the desk is powered. In the event of an uncontrolled shutdown, the device shall return to its last output state when power is restored. Devices requiring a UPS to provide such protections shall not be acceptable.
16. Output shall be distributed over a 100/1000/10000 Mbps Ethernet network using Streaming ACN (sACN), and/or Art-Net protocols. The user shall be able to control the application of protocols at an individual address level.
17. Output shall additionally be allowed via local ports utilizing the USITT DMX512-A output protocol, where the lighting console has these ports installed.
18. The system shall support full bi-directional RDM communication with compatible devices via ETC Net3 and Response DMX/RDM Gateways. RDM communication shall adhere to ANSII standard E1.20-2006 Entertainment Technology - RDM - Remote Device Management Over DMX512 Networks. Supported RDM features shall include:
    a. Discovery and Identification of RDM-capable devices.
    b. Setting of start addresses, operating modes and additional settings as exposed by connected devices and controllable via RDM.
    c. Viewing of sensor data as provided by connected devices.
    d. Error reporting as provided by connected devices.
19. Integrated power control monitoring features shall be provided to allow indication of power control system status, error states and circuit load monitoring. Adjustment of circuit configuration from the console shall also be supported. Communications with the power control system shall utilize ANSI E1.17 2006 Entertainment Technology

Architecture for Control Networks.

20. Show data may be created and modified on a personal computer, using Windows 7 64-bit or higher operating systems, with a free offline editing application. The offline editor may also run natively on Macintosh platforms using OS 10.14 (Mojave) or later. The program shall also allow output to visualization software supporting the same protocols as the lighting system, without the need for additional keys or hardware. Systems that do not offer visualization output from a personal computer without additional keys or hardware shall not be acceptable.
21. PC: Windows 7, 64-bit or higher. Macintosh computer: OS 10.14 running a client software application. Connect to a control system via the network and view or modify current show data in an independent display environment, using an ETCnomad license key. When connected without the key, the computer shall operate in Mirror Mode, with the device to be mirrored selectable by the user.
22. Synchronized backup shall be provided via another full desk on the network, a processor unit or a PC/Mac using ETCnomad. The backup unit shall maintain synchronized playback with the host controller and shall take over control of the lighting system upon loss of communication with the host controller, either automatically or upon user confirmation. Use of two processor units to service and backup system output is also supported.
23. A maximum of 99 users may access and interact with show data simultaneously. Each user shall have an individual workspace. User identification may be assigned to more than one control device, allowing users to work in tandem, or allowing a designer/ALD to mirror the current display format, mode, and command line of the associated programmer. Partitioned control allows discrete control of channel/parameter groupings by user. Partitioned control may be easily enabled and disabled with no need to merge show data from multiple users.
24. Show files are saved across the system to all available integral hard drives simultaneously.
25. Support 32 individual simultaneous Time Code inputs or Event lists.
26. Controls and Playback:
    a. Manual Control and Programming Section:
        1) The programming keyboard shall be grouped by function. Major groupings shall be recording target functions, numeric keys, level assignment functions, display navigation functions and controls, as well as non-intensity parameter controls.
        2) The command keypad shall be fully interactive with the virtual controls, such as color pickers and direct selects. The command keypad shall allow navigation of virtual fields on displays and in dialogues, reducing the need for a pointing device.
        3) Provide direct select virtual controls, which provide "one touch" selection of channels, groups, palettes, presets, effects, snapshots, magic sheets, and macros. Labels and icons may be applied to the targets for quick reference, with a stock library of common images included, and custom images easily importable. The user shall be able to create custom direct selects, with any arrangement and combination of controls.
        4) Non-intensity parameters may be set numerically via an extensible keypad on the main display. This control shall be fully interactive with the page-able encoders. The display associated with the encoders shall display the current encoder function. The touch screen shall also access available modes for each parameter type, min, and max values for each parameter as applicable, as well as home position on a parameter basis.
        5) Only those parameters available for control in the active lighting system shall be displayed for control. Displays shall lowlight parameters not available to selected channels. Alternatively, the encoders may be placed in a state allowing parameters not applicable to the current selection to be suppressed.

6) Lamp controls provide direct access to luminaire functions such as striking and dousing arc lamps and calibrating entire fixtures or individual mechanisms of fixtures, as provided by the luminaire manufacturer. User access to these features is normalized across all manufacturers for ease of use. Use of a "control channel" for accessing these functions shall not be required and systems requiring use of control channels for these functions shall not be acceptable.
7) Fan functions shall be provided both via command line operation and through encoder controls.
8) Highlight shall be supported, with user definable highlight values. Lowlight conditions may be defined for selected, but not specified channels. Rem Dim commands, at specific levels by channel, may be optionally and automatically called with the highlight command.
9) Fixtures with color mixing may be set with direct additive or subtractive encoder controls or the command line, as well as via the color pickers. Six optional color spaces are supported, as well as tinting tools, and spectrum tools for systems with more than two color mixing elements. Color may also be set directly to a gel match via a graphic selection tool or from the command line. The gel picker shall support tools for identifying similar colors, show favorites, and graphic indications of gel locations. Color Path tools, with intensity dampening, shall be provided.
10) The Virtual Media Server function shall allow the user to create two-dimensional layouts of devices, identified as pixel maps. Media content (images, movies, text, and procedurally generated effects) may then be applied, manipulated and stored. Stock content is provided and the user may import custom imagery and animations.
11) Macros shall allow the user to create strings of commands, and replay them manually or triggered by a cue, a submaster, or an outside source via OSC or sACN input. By default, macros triggered manually shall post to the command line, but those executed via cue lists shall run in the background. The user may override this behavior by defining the macro to always execute in the foreground or background, regardless of the recall method. Startup, Shutdown and Disconnect macros may also be defined.
12) Playback Section
13) Up to 1,000 playback faders may be defined on the fader array, on pages of ten faders each.
14) Faders may be grouped for playback, with sliders and button action defined by the user.
15) Instantaneously halt an active cue, back to the previous cue, manually override the intensity fade or manually override the entire fade or go to a cue at a specified percentage of completion.
16) Cue list to contribute to background state or for the contents of each cue list to be withheld from such.
    a) Priority and background priority states may be established.
17) Playback Faders: To have the following associated controls:
    a) Freeze: Halts fader output
    b) Stop Effect: Stops action of an effect.
    c) Filter: Assigns fader filter states.
    d) Go To Cue 0: Reset a cue list.
    e) Off: Turns off contents of a playback, releasing control to the background state or to set to null.
    f) Assert: Replays an active cue.
    g) Release: Releases control to background and resets the cue list.
    h) Timing Disable, channel filters and independent status may also be defined.

i) The potentiometer shall be configurable as a proportional master, an intensity master, or manual master. Support for rate, effect rate, effect size and Master Only controls is also provided. Filtered manual timing masters and effects masters may be configured.
j) Rate Override / Fader Paging: Supported with associated controls.

b. Submasters:
1) Up to 999 proportional, fully overlapping additive, effect or inhibitive submasters may be defined. Submasters shall use system-defined colored graphics and LEDs (where available) to indicate submaster status. Each submaster may have fade up, dwell and down fade times. Submasters may be set to priority and background priority status.
2) Submasters may be set to HTP or LTP intensity. Non-intensity parameters on submasters shall be LTP only.
3) Exclusive mode for a submaster shall prohibit the live contribution of that submaster from storing to cues or other submasters. Shield mode prohibits access of associated channels from any other playback or manual control operations.
4) A submaster potentiometer may be defined as proportional, master only or intensity master. When set as an Intensity Master, a mark and unmark feature is supplied.
5) Motorized faders shall set submasters to required positions as fader pages are changed. Upon a page change, non-motorized faders shall blink the associated indicator LED, and display an arrow graphic to indicate the direction the user must move the fader to match the newly mapped content. The user shall not gain control of the content until the non-motorized fader has matched the content's value.
6) The submaster blind buffer shall be linked directly to live playback.
7) Set submaster values directly from the command line.
8) LTP submasters may be set to fade to background or to minimum value when the fader is returned toward zero.
9) Submaster values may contribute to the background state or be withheld.

c. Grand Master Fader
1) The location of the Grand Master shall be user definable. The grand master shall have associated blackout and blackout enable buttons.
2) Blackout shall send all associated intensity outputs to zero. Non-intensity outputs shall not be affected.
3) Lighting control devices with motorized faders shall set the grand master to required positions as fader pages are changed.
4) If the Grand Master Fader is set below 100 percent, the system shall display a virtual fader on all monitors, for access when the Grand Master is located on a fader page that is not visible.

27. Display Controls:
a. Format shall change the view of selected displays.
b. It shall be possible for the user to choose which parameter categories or parameters they wish to display. Parameters and categories shall have adjustable column widths.
c. Flexichannel modes shall change which channels are viewed in selected displays, as follows:
1) No modes
2) Parent channels only / cell channels only
3) Use Partitions
4) Flexichannel states shall change which channels are viewed in selected displays, modified by the flexi modes, as follows:
a) All channels
b) Patched channels.
c) Show channels.

d) Active/Moved channels.
e) Selected channels.
f) Manual Channels.
g) View channels (user identified list).
h) Channels with discrete timing.

d. Expand shall extend the selected view sequentially across connected displays.

e. "Time" depressed shall display discrete timing data. "Data" suppressed shall display absolute values of referenced data. These controls may be latched.

f. Displays may be toggled to show stored data currently manually overridden, the source of the current parameter data, output level, patch assignment, part structure and referenced marking data. These controls may be latched.

g. User definable magic sheets shall provide alternative display of and access to channels and record targets. Multiple magic sheets may be created, each with a variety of zoom and placement factors for rapid recall of the required view. User-definable, interactive displays may be created. These displays, which can be used in live and blind operating modes, allow graphical layout of channels, desk buttons and programming tools. Standard symbols are provided, and the user may import their own symbols or graphics. Each symbol may be individually defined with data feedback characteristics. Non-interactive status information, such as a mirror of other user's command lines, may also be included in the display. A graphical browser is provided for fast selection of these views. Multiple zoom factors and placements may be stored and recalled for each display.

h. Playback status displays are provided with a variety of different formats. Indications are provided per cue for live moves (lights fading from zero and moving non-intensity parameters) and dark moves (inactive lights which have stored non-intensity parameter moves). The user may select a static or dynamic time display in the cue list itself.

i. Display content including which of the workspaces is in focus on any of the monitors and what views are docked in those workspaces may be instantly recalled using snapshots.

28. Operating Modes

a. Live Mode

1) Channel lists may be constructed using the +, -, and Thru keys as well as the direct selects. Channel selection is fully interactive, regardless of the method used.

2) Levels may also be set with the keypad, level wheel and non-intensity encoders. "Selected" channels shall be those last addressed and under keypad control. Controls are provided for single button access to the last selected channel list, all channels with manual levels and all active channels.

3) Channels may be set at a user defined default level using the Level key. + percent and percent keys adjust channels quickly by user definable values.

4) Channels and/or channel parameters may be captured. Capture mode shall allow the user to selectively capture channel data at specific levels. Captured data shall be indicated on the Live display.

5) Sneak is used to restore specified channels to background states, default values, or send them to specified values, in user specified times.

6) Selected channels may be set at a level or held to current values while other channels are set to zero using Rem Dim. Toggling Rem Dim restores unselected channels to original levels. The Rem Dim level shall be user definable via the command line or with a default setup value.

7) Channels may be recorded into groups for fast recall of commonly used channels. 10,000 groups shall be available. Groups shall store selection order and subgrouping functions. The Offset function supports rapid

creation of ordered groups, including reverse and random order.

8) Parameter Settings: Stored to Intensity, Focus, Color, Beam Palettes, and to Presets. Referenced data may be stored to whole numbers or up to thousandths decimal places between each whole number.

9) The following conditions may be placed on a channel or channel parameter to be included with a cue record action.
   a) Discrete fade time and/or delay.
   b) Block flag.
   c) Assert flag.
   d) IFCB Filters, which may be set at a parameter level.
   e) Release and restore.

10) 999 cue lists may be stored. Cues may be recorded in any order. Up to thousandth decimal cues may be inserted between any two whole number cues. Each cue may contain a maximum of twenty parts.

11) It shall be possible to record cues and cue parts with the following information:
   a) Any collection of channel data, as determined using "Record", "Record Only" or selective store commands, combined with parameter filters - including Effects.
   b) Cue Level timing and delays for Intensity Up, Intensity Down, Focus, Color and Beam.
   c) Follow or hang time.
   d) Link instruction.
   e) Loop value.
   f) Block, Assert, Preheat, Release, and/or Mark Flag.
   g) Curve.
   h) Rate.
   i) Allfade.
   j) Label and note.
   k) Alert countdown time.
   l) Timecode playback stamp.
   m) Scene label (cues only, not cue parts).
   n) Execute commands to trigger other activity (execute cue lists, cues, macros, snapshots, OSC and UDP strings, and MIDI raw commands).
   o) Cue list partitions shall be available to filter list content.

12) Channel parameters may be stored with an effect instruction. Effects may contain relative offsets from current value, or absolute instructions. Effects may be progressive actions or on/off states. Entry and exit behaviors modify the channel parameters activity when beginning and ending the effect. Channel and cue level overrides are provided.

13) Non-intensity channel parameters may be marked (pre-set), in two ways. Automark pre-sets any parameter transitions in the cue just prior to intensity becoming active. Automark may be disabled on a cue or cue part basis, enabling a "live" move. Alternatively, non-intensity parameters may be marked to a specific cue with a single command instruction. It shall not be necessary to store or update these parameters directly into the cue in which the movement is to occur.

14) Update may be used to selectively add modified parameter data quickly to that parameter's current source. Trace may be used to modify the data to the original source of its move instruction. It shall be possible to update inactive record targets. A context sensitive display provides detailed information regarding the results of the update command.

15) Recall From quickly pulls specified data from record targets or other channels into the current view. Recall on an HTP basis shall be provided.

16) Copy To quickly copies selected data to specified channels or other

record targets.

17) Address and channel check functions shall be provided.
18) Channel parameters may be "parked" at levels. Those levels are not added to any live record operations, nor may they be changed until the parked element is "unparked". Scaled park provides real time proportional adjustment of stored intensity values. Address Park shall also be provided.
19) About shall provide detailed status of selected channels or specified record targets. This shall include current source, current value, discrete timing, parked value, marked to and for indications. Background levels and current DMX output are also displayed. Channel usage indicates submaster and cue information and provides a "dark moves" report on a per channel basis.
20) 10,000 snapshots may be stored which instantly recall specified front panel and display configurations.
21) Query shall allow selection of channels by their current or possible state. Keywords and fixture types shall allow quick access to fixtures.
22) User definable home positions, on a per channel basis, may be defined.
23) Undo shall be used to sequentially step back through manual operations or to undo record and delete actions. It shall be possible to undo multiple commands in one action.

b. Blind Mode
   1) The Blind display allows viewing and modification of all record targets without affecting stage levels.
   2) Record target data may be displayed in a summary view, a detailed table orientation or a spreadsheet view, which allows quick data comparisons, move, and replace functions.
   3) Changes to blind data shall be automatically stored. Range selection of both record targets and channels shall be supported.

c. Staging Mode
   1) Staging mode shall allow temporary changes to be made to the lighting system, which are only displayed on Live and Blind displays and represented in the 3D environment, without changing the live output to the lighting system, so that the user may preview changes before committing them to output.
   2) Staging mode shall be accessible in Live or Blind mode, and the user shall be able to abandon or commit changes to the live output or to the stored database separately. The user may leave Staging mode, and the buffer shall remain until the user clears the changes.

d. Patch Display
   1) Patch shall be used to display and modify the system control channels with their associated library data.
   2) Each channel may be provided with a proportional patch level, curve, label, swap and invert functions, Live/Dark flag enable/disable, as well as keywords to service Query.
   3) A full library of profiles is provided, with the ability for the user to define "favorites" for fast selection. The user may also modify library profiles or create new profiles, to function with any controlled device.
   4) Offset functions in patch shall allow selection of channel ranges and shall allow the user to establish a "custom" footprint for any device output.
   5) Custom color wheels, color scrolls and gobo wheels shall be defined in patch. These devices shall be created with a simple table and graphical user interface supported by images of major manufacturers.
   6) The user may define or modify color configuration for parameters of color-changing fixtures, allowing the color picking tools to accurately control a fixture's color system.

7) RDM discovery, patching and device monitoring shall be supported.
8) Copy to, Swap and Move functions shall be supported in patch.

e. Setup/Browser:
1) Access system, user, and device configurations.
2) Possible to partially merge show files. Users may select as much or as little of the show file as required, with renumber tools.
3) Import ASCII and Lightwright data files. Export as ASCII or .csv.
4) Access for show data storage, import, export, print to .pdf and clear functions, as well as show data utilities.
5) Support programming and playback of real time clock events, including cue, submaster and macro execution at specific times of specified days or at a time based on astronomical events.
6) Control screen: For network configuration, selecting date/time, software update controls, selecting functional language and/or keyboard for labeling option, and other system level tools.
7) Languages for prompts, advisories, and help: English, Bulgarian, German, Spanish, French, Italian, Polish, Slovenian, Russian, Japanese, Chinese simplified, Chinese traditional, and Korean.
8) Supported keyboards: Latin American, American International, United Kingdom, French, German, Italian, Korean, Norwegian, Russian, Slovakian, Turkish, Swiss, Swedish, Finnish, and Bulgarian.

29. Output and Integration of Power Control Monitoring and Configuration:
a. Lighting Control System: Provides communication with an ETC Sensor+ and Sensor3 dimming systems for remote monitoring and configuration of show specific functions from within the software application.
b. Circuit Level Configuration and Monitoring Functions Not Limited To:
1) Control mode (dimmable, switched, latch-lock, always on, off or fluorescent).
2) Curves.
3) Control threshold.
4) Min and Max Scale Voltage.
5) Preheat.
6) Scale load.
c. Rack status messages Not Limited To:
1) State of UL924 panic closure
2) DMX port error/failure
3) Network error/failure
4) A, B, C Phase below 90 or above 139 volts and headroom warning
5) Ambient temperatures out of range
d. Circuit status N limited to:
1) Module type and location
2) Output level
3) Control Source
4) Overtemp
e. Advanced circuit feedback Not limited to:
1) Load higher or lower than recorded value.
2) DC detected on output.
3) SCR failed on/off.
4) Breaker trip
5) Module has been removed.
6) Load failure
f. Shutdown due to Overtemp.

2.4 ENTERTAINMENT CONTROLS (MULTIVERSE)

A. Product Multiverse SHoW Baby as supplied by ETC Inc.

1. Model: 5900. Frequency: 2.4 GHz. Universes: 1.
2. Use Environment: Indoor.
3. Regulatory Compliance: FCC, IC, CE, ARIB, and RoHS. IP Rating: IP50.
4. Warranty: One year.
5. Physical:
    a. Length: 3.625 inch (92 mm. Width: 3.0 inch (76 mm). Height: 1.8 inch (46 mm).
    b. Antenna: 2 dBi.
    c. User Interface: One button/indicator lights.
    d. Construction: Injection molded plastic, black.
    e. Power Connector: 5.5 x 2.1mm, center ' positive, 9 mm mating depth.
    f. Data Connector: Neutrik 5P XLR Connectors for DMX IN and DMX OUT.
6. Electrical:
    a. Power: 5 to 30 VDC, 1W.
    b. Broadcast Power: 2.5 mW, 8 mW, 25 mW, and 80 mW.
    c. Broadcast Modes: Adaptive, Full, Low, Mid, High, and Max.
    d. DMX Burst Modes: Auto dynamic.
    e. Ethernet Protocols: N/A.
    f. SHoW IDs: Multiverse: 307; Neo: 70.
    g. RF Sensitivity: -95 dBm.
    h. RDM Features: RDM Proxy, and RDM Responder.

B. Product Multiverse Transmitter 2.4 GHz (x2) as supplied by ETC Inc.
1. Model: 5911. Frequency Range: 2.4 GHz (x2). Universes: 10.
2. Use Environment: Indoor.
3. Ambient Room Temperature: 32 to 104 degrees F (0 to 40 degrees C.
4. Regulatory Compliance: FCC, IC, CE, ACMA, ARIB, cETLus Listed, and RoHS. IP Rating: IP50.
5. Warranty: One year.
6. Physical:
    a. Length: 7.75 inch (196.9 mm). Width: 4.0 inch (101.5 mm). Height: 1.85 inch (47 mm).
    b. User Interface: DMXcat app for iPhone, Android, or Amazon Fire. Free download.
    c. Construction: Die cast aluminum.
    d. Antenna: RP-SMA Female.
    e. AC: powerCON TRUE1 in/thru.
    f. DC: Locking DC Jack, 5.5 x 2.1 mm, center positive, 12.1 mm mating depth; EtherCON.
7. Electrical:
    a. Power: 100 to 240 VAC 50/60Hz, 5 to 30 VDC. PoE Class 0, 0.5 W max.
    b. Broadcast Power: 3.2 mW, 10 mW, 32 mW, and 100mW
    c. Broadcast Modes: Adaptive, Full, Low, Mid, High, and Max
    d. DMX Burst Modes: Auto dynamic.
    e. Ethernet Protocols: 802.11 bgn, 100 BASE-T sACN, Art-Net.
    f. SHoW IDs: 147.
    g. Latency: 4 ms average.
    h. RF Sensitivity: -95 dBm.
    i. RDM Features: RDM Proxy and RDM Responder.

2.5 ENTERTAINMENT CONTROLS (PATHWAY)

A. Product: PWPP RM P8 TERM REAR Eight-Port Gateway by Pathway Connectivity Inc.
1. Model: PWPP RM P8 TERM REAR 8-PORT DMX/RDM
2. Standards Compliance: cETLus Listed, CE compliant, EAC certified, RoHS compliant, and WEEE.
3. Functional:

a. Supports Net3/ACN per ANSI E1.31 and E1.17, RDM (ANSI E1.20), and Supports USITT DMX512-A per ANSI E1.11.
b. Compliance: USITT DMX512 and ANSI E1.11 DMX512-A.
c. Flexible Output Patch: Allows a 512-address universe to begin at any output address.
d. Advanced Input Patch.
e. Support for per-addressor per-universe-level priority.
f. Delay Time: From input to output not greater than one packet time.
g. Selectable DMX refresh rate: Maximum of 40 Hz.
h. Supports 256 total RDM devices.

4. Mechanical:
   a. Intuitive four-button interface.
   b. Onboard display for identification, status, and configuration.
   c. Fabricated from 16-gauge cold-rolled steel.
   d. Finish: Black, Fine-textured, powder-coat.
   e. C-clamp and U-bolt hardware available.
   f. Half 19 inch equipment rack width allows eight DMX ports in 1U height.
   g. Network, power, and data activity LED indicators.
      1) Blue power indicator, green network activity indicator.
      2) Bi-color DMX activity indicator.
   h. Repositionable RJ45 connector for connection to lighting network.
   i. Reset button for hard reset or forced reboot.
5. Environmental:
   a. Ambient Operating Temperature: 32 to 104 degrees F.
   b. Operating Humidity: 95 percent non-condensing.
   c. Storage temperature: Minus 40 to 158 degrees F.
6. Electrical:
   a. Compliant with IEEE 802.3i for 10BASE-T, 802.3u for 100BASE-TX and 802.3af for Power over Ethernet.
   b. Power Input: 12 to 24 VDC for use with non-PoE systems.
   c. Maximum seven-watt current draw.
7. Configuration:
   a. Local configuration options.
   b. Remote configuration by Concert.
      1) Supports 512 DMX addresses per port.
      2) Supports 63,999 Streaming ACN universes.
   c. DMX data input or output configurable by user.
   d. Multiple sources may be combined to the network with each source or address allowed an independent priority.
   e. Individual port start address and offset.
   f. User-configurable labeling.

B. Product: Pathway PWPP WM P2 XLR5F Two-Port Gateway by Pathway Connectivity Inc.
1. Standards Compliance: cETLus Listed, CE compliant, EAC certified, RoHS compliant, and WEEE.
2. Two-Port Gateways: Wall-Mount.
   a. Model: PWPP WM P2 XLR5F Wall-mount 2-port Gateway. 2 XLR Output.
3. Color: As determined by the Architect from the Manufacturer's offering.
4. Functional:
   a. Supports Net3/ACN per ANSI E1.31 and E1.17, RDM per ANSI E1.20, USITT DMX512-A per ANSI E1.11.
   b. Compliance: USITT DMX512 and ANSI E1.11 DMX512-A.
   c. Flexible Output Patch allows a 512-address universe to begin at any output address.
   d. Advanced Input Patch.
   e. Support for per-addressor per-universe-level priority.

f. Maximum delay time from input to output not greater than one packet time.
g. Selectable DMX refresh rate with a maximum at least 40 Hz.
h. Supports up to 256 total RDM devices.

5. Mechanical:
   a. Intuitive four-button interface.
   b. Onboard display for identification, status, and configuration.
   c. Enclosed electronics assembly and faceplate.
   d. No visible means of attachment.
   e. Flush-mount in industry standard backbox, RACO 690 or equivalent. Surface-mount backboxes available.
   f. Construction: Injection-molded, ABS plastic.
   g. Network and power activity LED indicators.
      1) Blue power indicator, green network activity indicator.
      2) RJ45 connector for connection to lighting network.
   h. Reset button: For hard reset or forced reboot.
6. Environmental:
   a. Ambient Operating Temperature: 32 to 104 degrees F.
   b. Operating Humidity: 95 percent non-condensing.
   c. Storage temperature: Minus 40 to 158 degrees F.
7. Electrical:
   a. Compliant with IEEE 802.3i for 10BASE-T, 802.3u for 100BASE-TX and 802.3af for Power over Ethernet.
   b. Power Input: 12 to 24 VDC for use with non-PoE systems.
   c. Current Draw: Maximum 4 W.
8. Configuration:
   a. Local configuration options.
   b. Remote configuration by Concert.
      1) Supports 512 DMX addresses per port.
      2) Supports 63,999 Streaming ACN universes.
   c. DMX data input or output configurable by user.
   d. Multiple sources may be combined to the network with each source or address allowed an independent priority.
   e. Individual port start address and offset.
   f. User-configurable labeling.

2.6 POWER CONTROL ENCLOSURES

A. Product: Sensor IQ Intelligent Breaker System by ETC Inc. Provides 120/208 V, 120/240 V, or 277/480 V mains-fed power distribution for up to 48 branch circuits. Combines high inrush rated overcurrent protection, switched power control, and power usage/breaker status reporting in a single device. Integrated DMX and Ethernet connectivity. Optional 0-10 V dimming, DALI output, contact inputs, and isolated ground bar for audio loads.
   1. IQ48 Enclosure: 48 branch breaker slots, 3-phase 120/208 V mains feed.
   2. Mechanical:
      a. Construction: 16-gauge steel.
      b. Finish: black, fine-textured, scratch-resistant powder coat paint.
      c. Removable outer panel includes integral locking door to limit access to electronics, breakers, and local relay overrides.
      d. Full front access with no side clearance required.
      e. Removable covers for access to Class 1 and Class 2 wiring.
      f. Complies with California building code - seismic zone four.
   3. Electrical:
      a. Mains feed power input to support 120 / 208 V three-phase four-wire or 120 / 240 V bi-phase three-wire plus ground.
      b. Max current input: 100 A at 12 circuits, 200 A at 24 circuits and 400 A at 48

circuits.
c. Quiescent draw: < 10 W with relays at steady state.
d. Optional isolation between chassis and equipment grounding.
e. Short-circuit current rating: 22,000 A or 65,000 A symmetrical.
f. Overloads occurs at 50 operations of 600 percent of rated current.
g. Feeder entry supported at top or top side.
1) Bottom or bottom side entry supported by rotating enclosure during installation.
h. Load wire entry supported on top, sides, or bottom.
4. Thermals:
a. Operating Temperature: 32 to 104 degrees F (0 to 40 degrees C).
b. Humidity: 5 to 95 percent non-condensing.
5. Branch breakers:
a. Trip mechanism: Hydraulic magnetic.
b. Bus connection type: Stab on.
c. Inrush-pulse tolerance: 25 times rated current for half-cycle.
d. Load lugs accept 14-6 AWG load wiring.
e. Integral current sensing.
f. Integral trip sensing.
g. Control and status provided by contact pads directly at bottom of the breaker case. No external wires or connections required for control or feedback.
h. Visible state indication:
1) LED On, Handle On: Output active.
2) LED Off, Handle On: Remotely controlled off (Smart breakers only).
3) LED Off, Handle Off: Breaker tipped/Manually off.
i. Remote Feedback for breaker state, breaker type, current draw, and phase voltage.
6. Smart Breakers:
a. Integral mechanically held air gap relay.
b. Integrated hall-effect sensors detect contact positions.
c. Integrated solenoid for remote operation.
d. Supports manual reset using breaker handle without power.
7. Breaker Operational Ratings:
a. No load-remote switching (Smart Breakers): 1,000,000 cycles.
b. Resistive Load: 16 A (20 A branch breaker): 100,000 cycles.
c. Electronic load: 15 A, 100,000 cycles.
d. Handle operations: 10,000 cycles.
e. Duty cycle of 6 full cycles (12 operations) per minute.
f. Supports voltage isolation of 4000 V RMS.
g. Utilizes latching state, mechanically held relays (Smart Breakers only).
8. Breaker Models:
a. Breakers: 120 V Smart.
1) 1-pole: 15 A, 20 A, or 30 A.
9. Control:
a. User interface:
1) Graphical display with LED backlight.
2) Button Interface With: 0 to 9 number buttons.
3) Navigation Buttons: Up, down, back and enter.
4) "Light bulb" test button for local preset activation, sequence and set level overrides.
5) USB interface: For upload of setup and software updates.
b. Control Wiring Terminations:
1) Control Terminals: Accept 12 AWG wire.
2) Control Wiring Exiting Panel: Class 2.
3) Control Terminations: Utilize removable connectors.
c. Relay Modes: Normal (priority/HTP), latch-lock or last-action.

d. Configurable DMX on/off threshold.
e. Status feedback for breaker state, relay state, current drawer circuit, phase voltage and energy usage per circuit.
f. Presets and sequences:
1) Sixteen spaces with 64 presets per space configurable via local UI.
2) One 16 step sequence per space.
g. UL924 Listed emergency control bypass.
h. Configurable Data-Loss Behavior: Play preset; Hold last look; Wait and fade.

10. Accessories:
a. 0-10 V Dimming: 24 outputs of 0-10 V sink dimming control rated for 100 mA per output.

11. Standards Compliance:
a. Breakers: Listed to UL 489.
b. Enclosures: Listed to UL 67, UL 508, UL 924.
c. Complies with ANSI DMX512-A and ANSI E1.31 streaming ACN standard.
d. Complies with ESD immunity to IEC standard 1000-4-2.

12. Quantities and configurations of Sensor IQ enclosures, branch circuit breakers, and accessories to be supplied as shown on project drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer's recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

LUDINGTON HIGH SCHOOL Section 11 6163			
STAGE EQUIPMENT - Theatrical Lighting Systems			
Appendix A			
QTY	MAKE	MODEL	DESCRIPTION
CONSOLE			
1	ETC	ELEMENT 2 1K	Element 2 Console, 1,024 Outputs/Parameters
2	HP	W2Z50A8#ABA	Touch Monitor
1	FLEENOR	Preset 10	DMX Snapshot Controller
POWER MANAGEMENT			
1	ETC	IQ-48	Sensor IQ, 48 pole, 400A / 120V, 3P, breaker panel including control processor
1	ETC	IQ-MB200A65K-B	Sensor IQ Main Breaker Kit - 3-pole, 120V, 200A, 65kA SCCR, bottom feed
1	ETC	IQ DOOR 120-48S	Sensor IQ Door, for surface mount 48-circuit panel
48	ETC	IQ-SM B20	Sensor IQ 120V 20A single pole intelligent breaker with relay.
1	ETC	IQ-LVD	0-10V Dimming Control Option Kit includes 24 loops of low voltage dimming control
EQUIPMENT RACK			
1	Middle Atlantic	RACK HW KIT	RACK - Black 19" rack sized as job requires and to include: quad power box, and blank panels to fill
1	Middle Atlantic	REAR	REAR - Mounting or securing system for rack above with quad power box
1	Middle Atlantic	DOOR	DOOR - Door for Rack
1	Middle Atlantic	RACK HW KIT	Hardware Kit for Equipment racks with blank panels and required hardware
1	Middle Atlantic	PD-915R	9-Outlet Power Supply
1	PATHWAY	PWPP RM P8 TERM REAR	8-PORT DMX/RDM GATEWAY
2	By Owner	Existing Opto-Splitter	
1	Cisco	CBS350-24P-4G-NA	Cisco Business 350 Switch
1		PATCH PANEL 24X	2U 19" rack-mount patch panel with 24 open slots
23			Cat5e Modular Jack for above Patch Panel
1			UTP Pass through for patch panel
1			Snap-in blank for above Patch Panel
1	Middle Atlantic	BR1	1U Brush Grommet Panel
24			2' CAT5 Patch cable, black

	Middle Atlantic	1000R	1000VA / 750W 1U rack-mount UPS
NETWORK CONTROL DEVICES			
6	PATHWAY	PWPP WM P2 XLR5F	Pathway 2 Port Wall-Mount Gateway XLR Out
6	ETC	2SBD-4	2SBD-4 - ETC 2-gang Surface Mount Back Box (3.5" deep)
6	ETC	UBOLTKITOFFSET	Offset U-Bolt Pipe-mounting Assembly
2	ETC	ECPB NET	ETCNet Control Plug-in Station with: 1 - RJ-45 (568B) Connector in XLR case
3	ETC	ECPB PB1	ETC 1-gang, 2.5" deep back box, surface mount
INSTALLATION NOTES			
All relay panel, equipment rack, conduit, and new cable installation shall be performed by a Licensed Electrical Contractor (EC).			
CHARGES FOR SHIPPING AND INSTALLATION			
SHIPPING: Base Bid to include all shipping charges to the job site.			
INSTALLATION: Base Bid to include all installation charges NOT designated to be performed by the installing Electrical Contractor; to include (But Not Limited To) Data Terminations, Programming, System Energizing & Commissioning, and User Training.			

SECTION 11 61 73
STAGE EQUIPMENT - THEATRICAL LIGHTING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Entertainment LED luminaires (Source Four LED) (Desire) (4wrd) (ColorSource)

1.2 RELATED SECTIONS

A. Section 11 61 33 – Stage Equipment – Rigging and Draperies

B. Section 11 61 63 – Theatrical Lighting Systems

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data:
1. Manufacturer's data sheets on each product to be used.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Typical installation methods.

C. Verification Samples: Two representative units of each type, size, pattern, and color.

D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

D. Standards Compliance: Luminaire testing is by nationally recognized third-party labs in compliance with IES LM-84.

1.5 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Manufacturer's standard limited warranty unless indicated otherwise.
   1. Unless Specified Otherwise: Fixtures: 5 years. LED Arrays: 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: ETC, Inc., which is located at: 3031 Pleasant View Rd. P. O. Box 620979; Middleton, WI 53562-0979; Tel: 608-831-4116; Fax: 608-836-1736; Email: request info (mail@etcconnect.com); Web: http://www.etcconnect.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
   1. Standards Compliance: Luminaire testing is by nationally recognized third-party labs in compliance with IES LM-84.
   2. Warranty Unless Specified Otherwise: Fixture: 5 years. LED Array: 10 years.

2.2 ENTERTAINMENT LUMINAIRES (4WRD SERIES)

A. Basis of Design: Source 4WRD II (Watt Reduction Device) Engine as manufactured by ETC Inc. A replacement for a Source Four burner. Converts the HPL source to a white-light LED and provides a significant reduction in power consumption. Theatrically dimmable via DMX or line dimmable, with a traditional LED curve, to allow flexibility for your installation.
   1. Standards Compliance:
      a. Complete Luminaire: UL 1573 and CSA C22.2 No. 166.
      b. Retrofit Kit: UL 1598C and CSA TIL B79-A.
      c. Compliance: CE.
   2. Source 4WRD II, Retrofit Kit, 120 V.
   3. Source:
      a. LED Details: S4WRD II LED.
      b. Max Lumens: 3200 K: 11430. 3200 K Gallery: 9716. Daylight Gallery: 10333.
      c. Lumens per Watt:
         1) 120 V: 3200 K: 76.2. 3200 K Gallery: 64.8. Daylight Gallery: 68.9.
      d. L70 Rating: Greater than 45,000 hours.
   4. Color:
      a. Colors Used: Warm or Cool White.
      b. Color Temperature Range: 3200 K 80+ or 90+ CRI, 5900 K 90+ CRI.
      c. Calibrated Array: No.
      d. Red Shift: No.
   5. Optical:
      a. Field Angle Range: Swappable lens tubes between 5 to 90 degrees.
      b. Gate Size: 79 mm.
      c. Aperture Size: Lens dependent.
      d. Pattern Projection: Yes.
      e. Camera Flicker Control/Hz Range: No, not PWM dimmed.
   6. Control:
      a. Input Method: DMX Control per line dimmed. Protocols: DMX/RDM via RJ45.
      b. Modes (Footprint): 1 Channel (Intensity) for DMX.
      c. RDM Configuration: Yes.

d. User Interface Type: 7-segment address display, local level control via UI.
e. Local Control: Yes.
f. Onboard Presets: No. Onboard Sequences: No. Onboard Effects: No.
g. Fixture to Fixture Control: No.

7. Electrical:
   a. Voltage: 120 VAC: 114 to 125 V, 60 Hz. 230 VAC: 209 to 252 V, 50 Hz.
   b. Input Method:
      1) 120 V: Hardwired, 39 inch cord, Edison plug.
   c. Inrush First Half-Cycle: 30 A at 120 V. 12 A at 230 V,
   d. Fixtures per Circuit:
      1) 120 V: 14, 20 A switched circuit, R20 module or similar.
   e. Wattage (Typical/Standby): 1505 / 1.2 at 120 V. 175 / 3.7 at 230 V.
   f. Current Draw: 1.26 A at 120 V. 0.75 A at 230 V
8. Thermal: Operating Temperature: 41 to 104 degrees F.
   a. Fan: Yes, Not controllable.
   b. Droop Compensation: No.
   c. dB Range: 28 dBa. Average at 39 inches.
   d. BTUs/hour: 120 VAC: 529. 230 VAC: 597.
9. Physical: IP Rating: IP-20 indoor only.
   a. Materials: Cast aluminum. Colors: Black, white, silver, or custom.
   b. Mounting Options: Yoke.
   c. Included Accessories: 4WRD mounting post.

2.3 ENTERTAINMENT LUMINAIRES (COLORSOURCE)

A. Basis of Design: ColorSource CYC as manufactured by ETC Inc. A dedicated cyclorama fixture for creating beautiful, smooth washes of light on a cyclorama or wall. Five-color mix of red, green, blue, lime, and indigo for expanded range and color control.
   1. Standards Compliance:
      a. Listed: cETLus, UL 1573, and CSA C22.2 No. 166.
      b. Compliance: CE and EAC.
   2. Source:
      a. LED Details: 42 Lumileds LUXEON C LEDs.
      b. Max Lumens: 4117.
      c. Lumens per Watt: 31.
      d. L70 rating: greater than 50,000 hours.
   3. Color:
      a. Colors Used: Red, Green, Blue, Indigo, and Lime.
      b. Color Temperature Range: Range.
      c. Calibrated Array: Yes.
      d. Red Shift: No.
   4. Optical:
      a. Beam Angle Range: DMX-512 via 5-pin XLR connector
      b. Gate Size: N/A.
      c. Aperture Size: N/A.
      d. Pattern Projection: No.
      e. Pattern Size: N/A.
      f. Camera Flicker Control/Hz Range: Default: 1,200 Hz. RDM: 25,000 Hz.
      g. The ColorSource CYC has a built in accessory for spill control.
   5. Control:
      a. Input Method: DMX-512 via 5-pin XLR connector. Protocols: DMX.
      b. Modes (Footprint): 5 channel: IRGBS (5). Direct: IRGBILS (7). 1 channel: (1). RGB: RGB (3).
      c. RDM Configuration: Yes.
      d. User Interface Type: 7-segment address display, local level control via UI.
      e. Local Control: Yes.

f. Onboard Presets: Yes, 12. Onboard Sequences: Yes, 5. Onboard Effects: No.
g. FixtureLink support: Yes.

6. Electrical:
   a. Voltage: 100 to 230 VAC, 50 to 60 Hz.
   b. Input Method: PowerCON in and thru.
   c. Inrush First Half-Cycle: 39 A at 120 V. 74 A at 240 V.
   d. Fixtures per Circuit:
      1) 9, using power thru connector.
      2) 10, per 20 A switched circuit, R20 module or similar.
   e. Wattage (Typical/Standby): 133 / 1.4 W at 120 V. 116 / 1.2 W at 230 V.
   f. Current Draw: 1.11 A at 120 V. 1.11 A at 230 V.
7. Thermal: Operating Temperature: 32 to 104 degrees F.
   a. Fan: No. db Range: 18.5 dBa average at 39 inches.
   b. Droop Compensation: Yes.
   c. BTUs/hour: 453.
8. Physical: IP Rating: IP-20.
   a. Materials: Die-cast aluminum. Colors: Black, white, silver, or custom.
   b. Mounting Options: Yoke and floor.
   c. Included Accessories: Hanging yoke, power cable.

B. Basis of Design: ColorSource Spot V and ColorSource Spot VXT as manufactured by ETC Inc. Brings together a five-color light engine with the build-quality and support of an ETC product. Uses a mix of red, green, blue, indigo and lime LED emitters. ETC optics, adapters, and accessories.
   1. Standards Compliance:
      a. Listed: cETLus, UL 1598, UL 924, CSA C22.2 No. 250.0.
      b. Compliance: CE.
   2. Model ColorSource Spot V with shutter barrel, black.
   3. Source:
      a. LED Details: 60 Lumileds LUXEON Rebel and LUXEON C LEDs.
      b. Max Lumens: 9300.
      c. Lumens per Watt: 47.2.
      d. L70 Rating: Greater than 54000 hours.
   4. Colors:
      a. Colors Used Spot: Red, green, blue, indigo, lime.
      b. Color temperature Range: Color mixing.
      c. Calibrated Array: Yes.
      d. Red Shift: No.
   5. Optical:
      a. Beam Angle Range: 5 to 90 degrees. Swappable lens tubes.
      b. Gate Size: 80 mm.
      c. Aperture Size: 6.25 to 14 inches depending on lend tube.
      d. Pattern Projection: Yes.
      e. Pattern Size: A or B.
      f. Camera Flicker Control/Hz Range: 5 kHz and 25 kHz.
   6. Control:
      a. Input Method:
         1) DMX-512 via 5-pin XLR connector. Protocols: DMX512, RDM.
         2) City Theatrical Multiverse. Protocols: DMX512, RDM
      b. NFC Configuration: Yes, via Set Light app.
      c. RDM Configuration: Yes.
      d. User Interface Type:
         1) ColorSource Spot V: 7-segment 3 button interface.
      e. Local Control: Yes. (ColorSource Spot V only)
      f. Onboard Presets: Yes, 12. Onboard Sequences: Yes, 5. Onboard Effects: No.
      g. Fixture-to-Fixture Control: Yes.

h. 15-bit virtual dimming engine.

7. Electrical:
   a. Voltage: 100 to 240 VAC, 50 to 60 Hz.
   b. Input Method: powerCON True1 TOP in and thru.
   c. Inrush First Half Cycle: 55 A at 120 V. 59 A at 240 V.
   d. Fixtures per Circuit:
      1) Eight. (R20 module or similar).
8. Thermal: Operating Temperature: 32 to 104 degrees F.
   a. Fan: Yes. Controllable.
   b. Droop Compensation: Yes.
   c. BTUs/hour: 671.77.
9. Physical: IP Rating: ColorSource Spot V: IP-20. ColorSource Spot VXT: IP-65
   a. Materials: Die-cast aluminum. Colors: Black, white, silver, or custom.
   b. Mounting Options: Yoke.
   c. Included Accessories: Hanging yoke, 39 inch power cable, soft-focus diffuser in an A-size gobo holder.

C. Basis of Design: ColorSource Spot Jr. as manufactured by ETC Inc. Compact four-color light engine. A mix of red, green, blue, and lime LED emitters. Original and Deep Blue arrays. Built-in zoom capabilities. 5,708 lumen output.
   1. Standards Compliance:
      a. Listed: cETLus, UL 1598, CSA C22.2 No. 250.
      b. Compliance: CE and EAC.
   2. Model ColorSource Spot jr XLR, black.
   3. Source:
      a. LED Details: 52 Lumileds LUXEON C LEDs.
      b. Max Lumens: Standard: 5,708. Deep Blue: 5,426. Lumens per Watt: 44.8.
      c. L70 Rating: 54000 hours.
   4. Color:
      a. Colors Standard: Red, green, blue, lime
      b. Color Temperature Range: Color mixing.
      c. Calibrated Array: Yes.
      d. Red Shift: No.
   5. Optical:
      a. Beam Angle Range: 25 to 50 degrees. Swappable lens tubes.
      b. Gate Size: 1.96 inches.
      c. Aperture Size: 6.25 to 14 inches.
      d. Pattern Projection: Yes.
      e. Pattern Size: M. OD: 2.6 inch, ID: 1.89 inches, up to 0.080 inches thick.
      f. Camera Flicker Control / Hz Range: Default: 1,200 Hz. RDM: 25,000 Hz.
   6. Control:
      a. Input Method: DMX-512 via 5-pin XLR connector. Protocols: DMX512, RDM.
      b. RDM Configuration: Yes.
      c. User Interface Type: 7-segment 3 button interface.
      d. Local Control: Yes.
      e. Onboard Presets: Yes, 12. Onboard sequences: Yes. 5. Onboard effects: No.
      f. Fixture-to-Fixture Control: Yes.
      g. 15-bit virtual dimming engine.
   7. Electrical:
      a. Voltage: 100 to 240 VAC, 50 to 60 Hz. Input Method: PowerCON in and thru.
      b. Inrush, First Half Cycle: 35 A at 120 V. 45 A at 240 V.
      c. Wattage (Typical / Standby): 166 W / 2.6 W at 120 V. 162 W / 2.0 W at 240 V.
      d. Current Draw: 1.40 A at 120 V. 0.73 A at 240 V.
   8. Thermal: Operating Temperature: 32 to 104 degrees F.
      a. Fan: Yes. Not controllable. db Range: 202 dBA average at 39 inches.
      b. Droop Compensation: Yes.

c. BTUs/hour: 549.

9. Physical: IP Rating: IP-20.
    a. Materials: Die-cast aluminum. Colors: Black, white, silver, or custom.
    b. Mounting: Yoke.
    c. Accessories: Hanging yoke, 5 ft power cable.

D. Basis of Design: ColorSource Fresnel V as manufactured by ETC Inc. An affordable high quality Fresnel wash fixture with motorized zoom. Uses RGBIL color system.
1. Standards Compliance:
    a. Listed: cETLus, UL 1573, , CSA C22.2 No. 166.
    b. Compliance: CE and EAC.
2. Model ColorSource Fresnel V: Black
3. Arrays:
    a. RGBIL (Red/Green/Blue/Indigo/Lime).
4. Source:
    a. LED Details: 44 Lumileds LUXEON C LEDs
    b. Max. Lumens: 5,300.
    c. Lumens per Watt: 36.
    d. L70 rating: Greater than 54,000 hours.
5. Color:
    a. Color temperature Range: Color mixing.
    b. Calibrated Array: Yes.
    c. Red Shift: No.
6. Optical:
    a. Beam Angle Range: 13 to 44 degrees.
        1) Motorized zoom.
    b. Gate Size: N/A.
    c. Aperture Size: 7"
    d. Pattern Projection: No.
    e. Pattern Size: N/A.
    f. Camera Flicker Control/Hz Range: Default: 5kHz. RDM: 25,000 Hz.
7. Control:
    a. Input Method: DMX-512 via 5-pin XLR connector. Protocols: DMX512, RDM, City Theatrical Multiverse, NFC.
    b. RDM Configuration: Yes.
    c. NFC Configuration: Yes
    d. User Interface Type: 7-segment 3 button, single encoder interface.
        1) Encoder controls local motorized zoom
    e. Local Control: Yes.
    f. Onboard Presets: Yes, 12. Onboard Sequences: Yes, 5. Onboard Effects: No.
    g. Fixture-to-Fixture Control: Yes.
    h. 15-bit virtual dimming engine.
8. Electrical:
    a. Voltage: 100 to 240 VAC, 50 to 60 Hz. Input Method: PowerCON True1 in and thru.
    b. Inrush First Half-Cycle:
    c. Fixtures per Circuit:
        1) 20 Amp Power-Thru Connector: Quantity of 8.
        2) R20 Module or Similar: Quantity of 9.
        3) Wattage at 120 Volts: 148.4 W.
        4) Wattage at 240 Vol: 147 W.
        5) Current Draw at 120 Volts: 1.28 Amps.
        6) Current Draw at 240 Volts: 10.70 Amps.
9. Thermal: Operating Temperature: 32 to 104 degrees F.
    a. Fan: Yes. Not controllable. dB Range: 22.9 dBA average at 39 inches.
    b. Droop Compensation: Yes.

10. Physical: IP Rating: IP-20.
    a. Materials: Die-cast aluminum. Colors: Black, white, silver, or custom.
    b. Mounting Options: Yoke or floor stand.
    c. Included Accessories: Power cable and hanging yoke.
    d. Seven-segment, three-button Interface.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturers recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

LUDINGTON HIGH SCHOOL - Section 11 6173			
STAGE EQUIPMENT - Theatrical Lighting Fixtures			
Appendix A			
QTY	MAKE	MODEL	DESCRIPTION
THEATRICAL LED LIGHTING FIXTURES AND ACCESSORIES			
51	ETC	ETC - CSSPOTVMVS-A	ColorSource Spot V, light engine with EDLT shutter barrel, w/ Multiverse, black - Includes C-Clamp (w/Edison plug to TrueOne Top)
18	ETC	419EDLT	19° EDLT lens tube, black
2	ETC	426EDLT	26° EDLT lens tube, black
27	ETC	436EDLT	36° EDLT lens tube, black
4	ETC	LED50LT	50° LED-specific EDLT lens tube, black
8	ETC	ETC - CSSPOTJR2550-A	ColorSource Spot jr, Original, black (w/Edison plug to PowerCon)
8	ETC	ETC - CSSPOTJRAK	ColorSource Spot jr accessory kit (pattern/gobo holder, soft focus diffuser, accessory holder, media/gel frame)
21	ETC	CSFRESVMV-A	ColorSource Fresnel V, w/ Multiverse, black (w/Edison plug to TrueOne Top)
9	ETC	CSCYC-A	ColorSource CYC 120V with XLR, black (w/Edison plug to PowerCon Blue)
16	ETC	S4WRDT120-A	Source 4WRD II, retrofit kit, black, w/GSP (Edison) plug.
2	ETC	S4WRDACCKIT	RJ45 Data Accessory Kit (contains W6538, W6539 and N4086)
38	ETC	400CC	Black C-Clamp
89	ETC	400SC	Black Safety Cable
CABLES			
12	ETC	CD6-NET	6' network control cable twisted pair, RJ45 (FOR S4WRDs)
12	ETC	CD12-NET	12' network control cable twisted pair, RJ45 (FOR S4WRDs)
2	ETC	CD25-NET	25' network control cable twisted pair, RJ45 (FOR S4WRDs)
40	LEX	DMX-5P-5	5 Pin DMX - Tour Grade LEX 2 Pair Black Cable 5'
40	LEX	DMX-5P-10	5 Pin DMX - Tour Grade LEX 2 Pair Black Cable 10'
6	LEX	DMX-5P-25	5 Pin DMX - Tour Grade LEX 2 Pair Black Cable 25'
10	LEX	PE700J-5-PCN	12/3 SJ PowerCON® Extension 5'
10	LEX	PE700J-10-PCN	12/3 SJ PowerCON® Extension 10'
4	LEX	PE700J-25-PCN	12/3 SJ PowerCON® Extension 25'
6	LEX	PE700J-5-PCN	12/3 SJ TrueOne® Extension 5'
6	LEX	PE700J-10-PCN	12/3 SJ TrueOne® Extension 10'

4	LEX	PE700J-25-PCN	12/3 SJ TrueOne® Extension 25'
SHIPPING AND INSTALLATION			
SHIPPING: Base Bid to include all shipping charges to the job site.			
INSTALLATION: Base Bid to include: Unpacking, Hang, Programming, & Focus of theatrical lighting fixtures as per the Owner's Light plot.			

LUDINGTON HIGH SCHOOL
AUDITORIUM LIGHTING & RIGGING
RENOVATIONS 2024
BID# TBD

TASK	PROVIDE	INSTALL
AC POWER, CONDUIT, RACEWAYS, ELECTRICAL BACKBOXES, JUNCTION BOXES, PULL WIRE, CABLE TRAYS, FLOOR BOXES, AND OTHER CABLE INFRASTRUCTURE	EC	EC
ELECTRICAL BACKBOXES, FLOOR BOXES	TLV	EC
THEATRICAL LIGHTING CABLE IN CONDUIT	EC	EC
THEATRICAL LIGHTING RELAY PANELS AND DIMMER RACKS	TLV	EC
DATA TERMINATIONS OF THEATRICAL LIGHTING CABLE	TLV	TLV
GENERAL ROOM LIGHTING DIMMING SYSTEMS (MULTI-ZONE)	EC	EC
LOW VOLTAGE CONTROL WIRE INSTALLATION	EC	EC
THEATRICAL LIGHTING FIXTURES - UMPACKING, HANG, PROGRAMMING & FOCUS	TLV	TLV
CABLE MANAGEMENT HARDWARE AT RACKS AND CONSOLES	TLV	TLV
FLOOR BOXES INCLUDING INTERNAL BRACKETS, TEMPORARY COVERS, AND PERMANENT COVERS	EC	EC
CUSTOM COVER PLATES FOR FLOOR BOXES, BACK BOXES	TLV	TLV
LOW VOLTAGE CONTROL WIRING TERMINATIONS	TLV	TLV
RIGGING ARBOR SYSTEMS	TRV	TRV
DRAPERIES	TRV	TRV
EC - ELECTRICAL CONTRACTOR		
TLV - THEATRICAL LIGHTING VENDOR		
TRV - THEATRICAL RIGGING VENDOR		

CONDUIT GENERAL NOTES FOR ELECTRICAL CONTRACTOR
- EC to provide and install all conduit, backboxes, gutter boxes, terminal cans, raceways,
cable trays and access panels unless otherwise noted.
- EC to install pull lines in all conduits.
- EC shall not substitute conduit type without written permission from the consultant.
- Conduit runs are drawn for illustration only. Actual conduit paths & interim boxes to be
determined by the EC.
- EC may increase the size of junction boxes, gutters & conduit as needed in the event
that a conflict exists.
- EC to provide and install all high voltage (120V - 240V) cable and fixtures unless
otherwise notes.
- Install applicable size pull boxes after 270 deg. of bend or if conduit run is more than 100'.
- Label all conduit for destinations such as box numbers and/or room locations.
- Deburr all rough edges to prevent cable abrasion.
- Ensure all conduits are free from debris & water.
- Ensure all in ground pull boxes and vaults are weather proof & free of debris & water.
- Ensure conduit is electrically isolated from all equipment racks & enclosures

PREFIX	EQUIPMENT NAME ABBREVIATIONS
BD	BLUE DOME LIGHT
CON	DEVICE CONTROLLER
CPU	CENTRAL PROCESSING UNIT
DMX	DMX PLATE
ES	ENTRY STATION
JB	JUNCTION BOX
L	LIGHTING FIXTURE
LJ	LIGHTING JUNCTION BOX
LCR	LIGHTING CONTROL RACK
RP	RELAY PANEL
DR	DIMMER RACK
PB	LIGHTING PLUGBOX
PS	LIGHTING PLUGSTRIP
PSU	POWER SUPPLY
RMT	REMOTE CONTROL
RP	RACK PANEL
RX	RECEIVER
SEQ	POWER SEQUENCING DEVICE
TS	TOUCH SCREEN
TSP	PORTABLE TOUCH SCREEN
TX	TRANSMITTER

STATION COLOR AND MOUNTING KEY

COLOR DETAIL		MOUNTING DETAIL	
KEY	DESCRIPTION	KEY	DESCRIPTION
CRM	CREAM (RAL 9001)	S	SURFACE
IVR	IVORY (RAL 1015)	SL	SURFACE WITH LOCKING COVER
GRY	GRAY (RAL 7001)	SSL	SURFACE WITH SLIDING LOCKING COVER
BLK	BLACK (RAL 9004)	F	FLUSH
WHT	SIGNAL WHITE (RAL 9003)	FL	FLUSH WITH LOCKING COVER
CC	CUSTOM	FSL	FLUSH WITH SLIDING LOCKING COVER
CLR	UNKNOWN	U	U-BOLT
		OU	OFFSET U-BOLT
		MTG	UNKNOWN

STATION_ID
STATION TYPE
CLR | MTG
LOCATION

SHEET LIST	
TL & TR DRAWINGS	
NUMBER	NAME
TL-1	Symbols, Notes, Work Scope
TL-2	Box & Fixture Schedules
TL-3	Existing Lighting System Demo
TL-4	New Lighting System Plan
TL-5	Lighting System Riser
TR-1	Rigging System Demo
TR-2	New Rigging System Plan
TR-3	New Rigging Rear Elevation

SYMBOL	GENERAL ABBREVIATIONS
EC	ELECTRICAL CONTRACTOR
EXS	EXISTING EQUIPMENT
FBO	FURNISHED BY OTHERS
FL	FLUSH MOUNT
FOH	FRONT OF HOUSE
GC	GENERAL CONTRACTOR
LAN	LOCAL AREA NETWORK
NTS	NOT TO SCALE
OFE	OWNER FURNISHED EQUIPMENT
RK	RACK MOUNT
SR	SURFACE MOUNT
SSH	STANDARD SWITCH HEIGHT
SWL	SAFE WORKING LOAD
TBD	TO BE DETERMINED
UON	UNLESS OTHERWISE NOTED

CONTROL WIRING LEGEND

SYMBOL	WIRE TYPE(S)	SIGNAL
D*	(1) BELDEN #9729	DMX INPUT
X*	(1) BELDEN #9729	DMX OUTPUT
N*	(1) BELDEN #1583A	ETCNet (CAT5e)
* = WIRE IDENTIFICATION NUMBER (NOT QUANTITY)		

PROJECT TITLE:
LUDINGTON HIGH SCHOOL
AUDITORIUM LIGHTING & RIGGING
RENOVATIONS 2024

PROJECT NO: TBD

BID# TBD

FANTASEE INTEGRATION

LUDINGTON HS AUDITORIUM

TL-1 SYMBOLS, NOTES, & SCOPES

SPECIFIER: R. BLAIN

DRAFTED BY: R. BLAIN

APPROVED:

DATE: 12/22/23

PLATE: 1 OF 8

SCALE: NTS

TL FIXTURE SCHEDULE			
LABEL	**MAKE**	**MODEL**	**NOTES**
LUDINGTON HIGH SCHOOL AUDITORIUM			
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 419EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 426EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 426EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ 436EDLT	
TBD	ETC	CSSPOTVMVS-A W/ LED50LT	
TBD	ETC	CSSPOTVMVS-A W/ LED50LT	
TBD	ETC	CSSPOTVMVS-A W/ LED50LT	
TBD	ETC	CSSPOTVMVS-A W/ LED50LT	
TBD	ETC	CSSPOTJR2550-A	
TBD	ETC	CSSPOTJR2550-A	
TBD	ETC	CSSPOTJR2550-A	
TBD	ETC	CSSPOTJR2550-A	
TBD	ETC	CSSPOTJR2550-A	
TBD	ETC	CSSPOTJR2550-A	
TBD	ETC	CSSPOTJR2550-A	
TBD	ETC	CSSPOTJR2550-A	
TBD	ETC	CSCYC-A	
TBD	ETC	CSCYC-A	
TBD	ETC	CSCYC-A	
TBD	ETC	CSCYC-A	
TBD	ETC	CSCYC-A	
TBD	ETC	CSCYC-A	
TBD	ETC	CSCYC-A	
TBD	ETC	CSCYC-A	
TBD	ETC	CSCYC-A	

TL FIXTURE SCHEDULE			
LABEL	**MAKE**	**MODEL**	**NOTES**
LUDINGTON HIGH SCHOOL AUDITORIUM			
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	CSFRESVMV-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	
TBD	ETC	S4WRDT120-A	

BRANCH PANEL: RP-1

Location: DOWNSTAGE LEFT WALL | **Volts:** 3-phase, 4 wire, 120-208V | **A.I.C. Rating:**
Supply To: Theatrical Lighting | **Phases:** 3 | **Mains Type:**
Mounting: Surface Mount | **Wires:** 4 | **Mains Rating:**
Enclosure: Cabinet | | **MCB Rating:** 1A

Notes: 1) ETC SENSOR IQ48 Relay Panel 2) Circuit Assignments to be determined by Owner Pre-Demo.

CIRCUIT #	EXISTING CIRCUITS	TYPE	LOCATION	POLES	A	B	C	A	B	C	POLES	LOCATION	TYPE	EXISTING CIRCUITS	CIRCUIT #
1	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	2
3	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	4
5	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	6
7	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	8
9	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	10
11	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	12
13	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	14
15	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	16
17	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	18
19	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	20
21	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	22
23	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	24
25	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	26
27	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	28
29	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	30
31	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	32
33	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	34
35	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	36
37	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	38
39	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	40
41	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	42
43	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	44
45	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	46
47	TBD	RELAY	TBD	1	TBD	TBD	TBD	TBD	TBD	TBD	1	TBD	RELAY	TBD	48
			Total Load:												
			Total Amps:												

FIXTURE NOTES:
1) ALL FIXTURE LABELS TO BE DETERMINED BY THE OWNER PRIOR TO DEMO.

2) A LIGHT PLOT SHALL BE PROVIDED BY THE OWNER PRIOR TO DEMO,

BOX NOTES:
1) ALL CIRCUIT ASSIGNMENTS TO BE DETERMINED BY THE OWNER PRIOR TO DEMO.

PROJECT TITLE:
LUDINGTON HIGH SCHOOL
AUDITORIUM LIGHTING & RIGGING
RENOVATIONS 2024

PROJECT NO: TBD
BID# TBD

FANTASEE INTEGRATION

LUDINGTON HS AUDITORIUM

TL-2 BOX & FIXTURE SCHEDULE

PLATE: 2 OF 8

SPECIFIER: R. BLAIN

DRAFTED BY: R. BLAIN

APPROVED: | DATE: 12/22/23 | SCALE: NTS

FOH LIGHTING POSITION
NOT DRAWN IN ACTUAL
POSITION

APRON LIGHTING POSITION
NOT DRAWN IN ACTUAL
POSITION

THIS LINESET CONTROLS
THE THREE SIDED
LIGHTING POSITION OVER
THE APRON

NOTE: EC TO DISCONNECT INCOMING POWER FEED FROM EXISTING LEPRECON DIMMER RACK IN 2ND FLOOR ELECTRICAL ROOM AND REDIRECT INCOMING POWER TO THE AREA PRESENTLY OCCUPIED BY THE EXISTING PATCH PANEL. FATE OF THE EXISTING DIMMER RACK IS AT THE DISCRESION OF THE OWNER.

NOTE: EC TO DEMO AND DISPOSE OF EXISTING PATCH PANEL. RETAIN AND NUMBER ALL OUTGOING CIRCUITS AS PER EXISTING CIRCUT NUMBERING FOR LATER USE. EC TO DISCONNECT INCOMING POWER FEED FROM EXISTING LEPRECON DIMMER RACK IN UPSTAIRS ELECTRICAL ROOM, AND REDIRECT INCOMING POWER TO THE AREA PRESENTLY OCCUPIED BY THE EXISTING PATCH PANEL.

PROJECT TITLE:
LUDINGTON HIGH SCHOOL
AUDITORIUM LIGHTING & RIGGING
RENOVATIONS 2024

PROJECT NO: TBD BID# TBD

FANTASEE INTEGRATION

LUDINGTON HS AUDITORIUM

TL-3 EXISTING SYSTEM DEMO

PLATE: 3 OF 8

SPECIFIER: R. BLAIN

DRAFTED BY: R. BLAIN

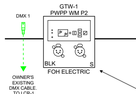
APPROVED:

DATE: 12/22/23

SCALE: NTS

NOTE: EC TO INSTALL 1-GANG DEEP BOX (TO BE SUPPLIED BY TLV) APPX 18" ABOVE FLOOR AND INSTALL CONDUIT AS REQUIRED TO EXTEND THROUGH THE CONTROL ROOM CEILING. PULL OWNER'S EXISTING NETWORK CABLE (TERMINATING AT LCR-1) THROUGH CONDUIT AND BOX. INSTALL ADDITIONAL CONDUIT AS CODE REQUIRES

FOH LIGHTING POSITION NOT DRAWN IN ACTUAL POSITION



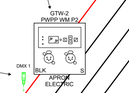
NOTE: GATEWAYS TO BE INSTALLED BY TLV USING OWNER'S EXISTING NETWORK CABLE. CABLE TO BE DIRECTED TO LCR-1.

NOTE: OWNER'S EXISTING DMX CABLE TO REMAIN. CABLE TO BE DIRECTED TO LCR-1.

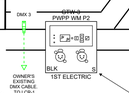
NOTE: GATEWAYS TO BE INSTALLED BY TLV USING OWNER'S EXISTING NETWORK CABLE. CABLE TO BE DIRECTED TO LCR-1.

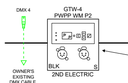
APRON LIGHTING POSITION NOT DRAWN IN ACTUAL POSITION

OWNER'S EXISTING DMX CABLE TO REMAIN. CABLE TO BE DIRECTED TO LCR-1.

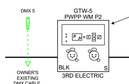


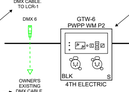
THIS LINESET CONTROLS THE THREE SIDED LIGHTING POSITION OVER THE APRON



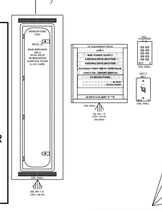


NOTE: GATEWAYS TO BE INSTALLED BY TLV USING OWNER'S EXISTING NETWORK CABLE. CABLE TO BE DIRECTED TO LCR-1.





NOTE: EC TO INSTALL RELAY PANEL. EQUIPMENT RACK, AND TWO 1-GANG DEEP BOXES (BOXES TO BE SUPPLIED BY TLV) ON DOWNSTAGE LEFT WALL. SEE DRAWING TL-5 SYSTEM RISER FOR DETAILS. EC TO SUPPLY ALL REQUIRED CABLES AND CONDUIT AS PER CODE.



NOTE: OWNER'S EXISTING DMX CABLE TO REMAIN. CABLE TO BE DIRECTED TO LCR-1.

PROJECT TITLE:
LUDINGTON HIGH SCHOOL
AUDITORIUM LIGHTING & RIGGING
RENOVATIONS 2024

PROJECT NO: TBD

BID# TBD

FANTASEE INTEGRATION

LUDINGTON HS AUDITORIUM

TL-4 LIGHTING SYSTEM PLAN

SPECIFIER: R. BLAIN

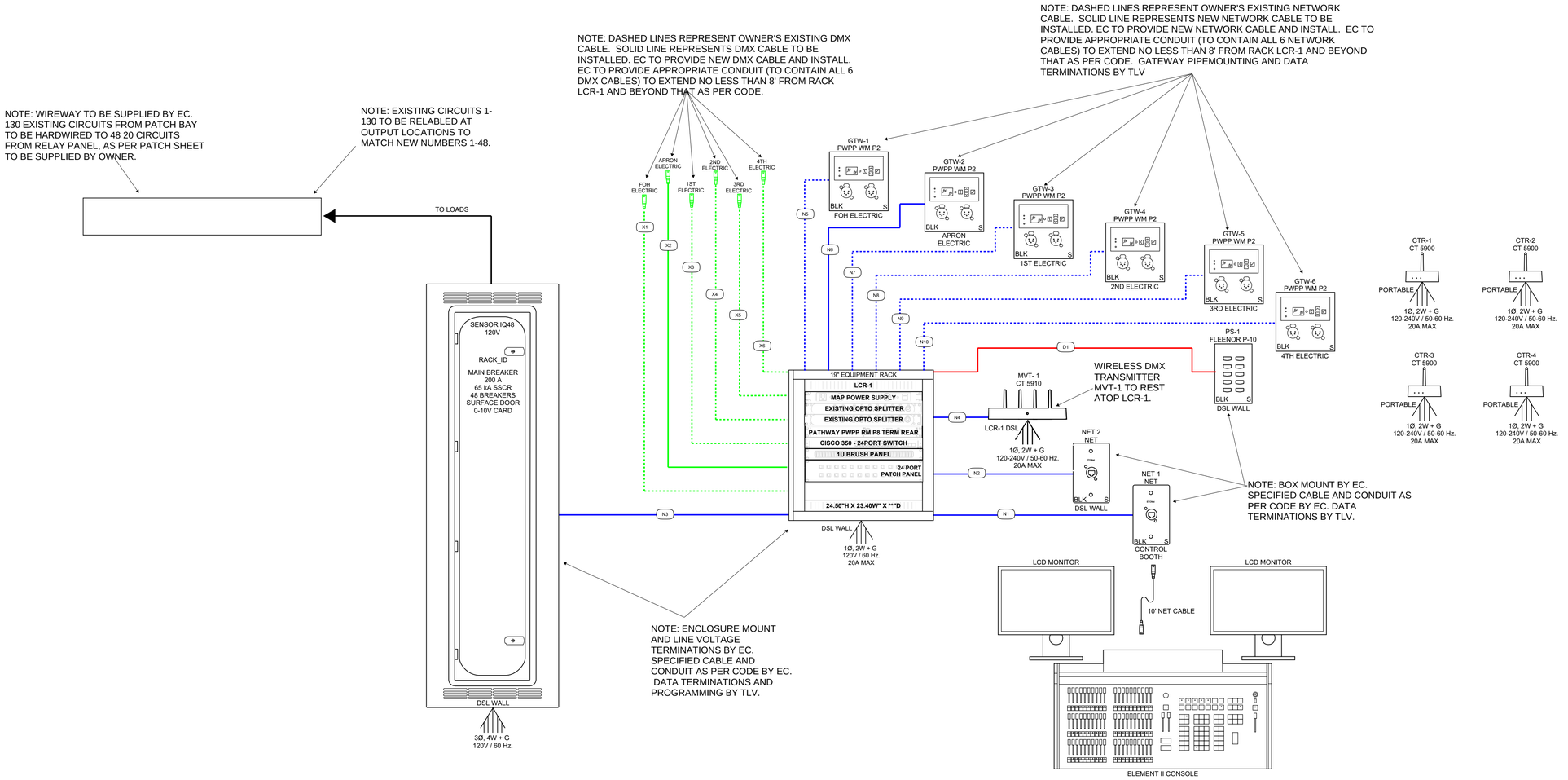
DRAFTED BY: R. BLAIN

APPROVED:

DATE: 12/22/23

PLATE: 4 OF 8

SCALE: NTS



NOTES:

1.) ALL CONTROL WIRING IS PROVIDED BY OTHERS UNLESS NOTED OTHERWISE.
2.) ALL ETCNet RUNS SHALL BE CONTINUOUS, UNSPLICED RUNS LESS THAN 300 FEET (90 METERS). ALL NETWORK CONNECTIONS TO BE TIA/EIA 568B.
3.) TOTAL COMBINED LENGTH OF UNISON/ECHO WIRING RUNS CANNOT EXCEED 1640 FEET (500 METERS).
4.) MAXIMUM GDS WIRE LENGTH WITH DOUBLE GROUND IS 498' (151 METERS) FOR THE ONE-ZONE SUPPLY AND 747' (227 METERS) FOR THE SIX-ZONE SUPPLY. FOR ADDITIONAL WIRE LENGTHS AND SIZES, SEE INSTALLATION MANUAL.
5.) ALL SERIAL RUNS SHALL BE NO GREATER THAN 50 FEET (15 METERS).
6.) PHOTO SENSOR RUN SHALL NOT EXCEED 1000 FEET (305 METERS) BETWEEN CONTROLLER AND REMOTE HEAD.
7.) ** - CIRCUIT NUMBERING MUST BE PROVIDED PRIOR TO MANUFACTURING.

STATION COLOR AND MOUNTING KEY

COLOR DETAIL	
KEY	DESCRIPTION
CRM	CREAM (RAL 9001)
IVR	IVORY (RAL 1015)
GRY	GRAY (RAL 7001)
BLK	BLACK (RAL 9004)
WHT	SIGNAL WHITE (RAL 9003)
CC	CUSTOM
CLR	UNKNOWN

STATION_ID
STATION TYPE
CLR | MTG
LOCATION

MOUNTING DETAIL	
KEY	DESCRIPTION
S	SURFACE
SL	SURFACE WITH LOCKING COVER
SSL	SURFACE WITH SLIDING LOCKING COVER
F	FLUSH
FL	FLUSH WITH LOCKING COVER
FSL	FLUSH WITH SLIDING LOCKING COVER
U	U-BOLT
OU	OFFSET U-BOLT
MTG	UNKNOWN

CONTROL WIRING LEGEND

SYMBOL	WIRE TYPE(S)	SIGNAL
D*	(1) BELDEN #9729	DMX INPUT
X*	(1) BELDEN #9729	DMX OUTPUT
N*	(1) BELDEN #1583A	ETCNet (CAT5e)

* = WIRE IDENTIFICATION NUMBER (NOT QUANTITY)

PROJECT TITLE:
LUDINGTON HIGH SCHOOL
AUDITORIUM LIGHTING & RIGGING
RENOVATIONS 2024

PROJECT NO: TBD

BID# TBD

FANTASEE INTEGRATION

LUDINGTON HS AUDITORIUM

TL-5 LIGHTING SYSTEM RISER

PLATE: 5 OF 8

SPECIFIER: R. BLAIN

DRAFTED BY: R. BLAIN

APPROVED:

DATE: 12/22/23

SCALE: NTS